

FLIGHT

The
AIRCRAFT
ENGINEER
and
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

- July 7 to 28 Exhibition of Aircraft Paintings by Mr. Geoffrey Watson, at Brook Street Art Gallery, 14, Brook Street, W., in Aid of R.A.F. Memorial Fund
- July 17 to 31 Seaplane Contests at Antwerp
- Aug. 3 ... Air Ministry Competition (Large and Small Type Aeroplanes)
- Aug. 28 & 29 Schneider International Race, Venice
- Sept. 1 ... Air Ministry Competition (Seaplanes)
- Sept. ... International aviation week (with competitions) at Brescia, Italy
- Sept. 8, 9 Fédération Aéronautique Internationale Conference, Geneva
- Sept. 27 to Oct. 2 Gordon-Bennett Aviation Cup, France
- Oct. 23 ... Gordon-Bennett Balloon Race, Indianapolis, U.S.A.

EDITORIAL COMMENT



THE race for the "Aerial Derby," held last Saturday, was undoubtedly a tremendous success. There was a splendid entry list, there were no serious accidents, and altogether the race furnished an excellent demonstration of the safety, speed and certainty of aerial travel. The winner's average speed over the whole course was 153½ m.p.h.—one of the most eloquent testimonies imaginable to the really marvellous stage of development which has been attained by the aeroplane. That he made a bad landing and crashed at the finish, after having actually crossed the winning line, was unfortunate. It was one of those accidents which are liable to happen in the best-regulated events, but even that had its fortunate side, in that Mr. Courtney sustained no injury worth speaking of.

The performances of the Baby Avro machines, which simply ran away with the handicap prizes, were undoubtedly remarkable in more than one way. Not only was their flying very consistent, but the principal value of their success is contained in the demonstration they gave of what can be accomplished by small machines, with low-powered engines. Obviously, there is a wide field of usefulness for such machines as these. They are relatively cheap to build, which is a factor possessing a great appeal to that section of the public which will, in the future, desire to possess machines for personal use. Even more important is the factor of running costs, which again are low in comparison with other types. As a matter of fact, such "Baby" machines can even now be operated for very little more in the way of running and upkeep costs than is entailed by the keeping of a high-powered car. To our way of thinking, it is to machines of this or similar type that the industry must look in the future for its greatest measure of support. They are the sister types to the light car in motoring, and as there are fifty people who can afford to run the latter to one who can aspire to the Rolls-Royce, so the proportionate number who will purchase and run machines

of the "Baby" type is far and away greater than that which will look to the high-powered aeroplane as a means of personal travel. Without the slightest desire to belittle the performances of the bigger machines, we cannot help regarding Saturday's race as a triumph for the "little fellows."

There is another aspect of the race to which, with the indulgence of the reader, we cannot help referring once more. We cannot estimate the numbers who actually saw the machines in flight, but we do know that every vantage point on the circular course had its crowds, every individual of which was intent upon the doings of each machine and who followed the event with intelligent interest. If there is anyone who had doubts as to the measure of public interest in aviation, he had only to betake himself to any of the chosen viewpoints on the course and he would have been converted instantly. As a matter of fact, we believe the public takes a great deal more interest than is generally believed by many inside the movement. It is true that the attendances at the recent Show tended to an opposite belief, but it should be remembered that to the man in the street an aeroplane standing inert under a glass roof has no particular appeal. The science is too new for the lay mind to properly appreciate the methods which are adopted to "make the wheels go round," and it will be a long time before the public understand as much about the aeroplane as they do about the car. The former is still, in spite of the War, something of a scientific curiosity—a practical one, it may be, but still a curiosity. It is quite different in the case of the machine in the air. Then it is in action—pulsating with life and possessed of all the appeal which is absent when it is merely figuring as an exhibit at the Show. That is why such events as the Aerial Derby have such an enormous propaganda value. They show actual performance, which is all the average person is able to appreciate as yet. He is scarcely concerned with the why and wherefore, which is beyond his ken. Later he will know and then Shows will interest him more. As it is we believe profoundly in the value to the movement of these circuit races, and wish sincerely there were many more of them.

The Post Office Coming into Line

A most welcome announcement was made recently, by the Postmaster-General, to the effect that as and from Monday last the extra postage for letters carried by the London-Paris air mail would be reduced from 2s. to 2d. per ounce. The fee of 6d. per packet in respect of letters designed for express delivery will still be charged. We congratulate the postal authorities on this evidence of enterprise and appreciation of the real possibilities of aerial mail transport.

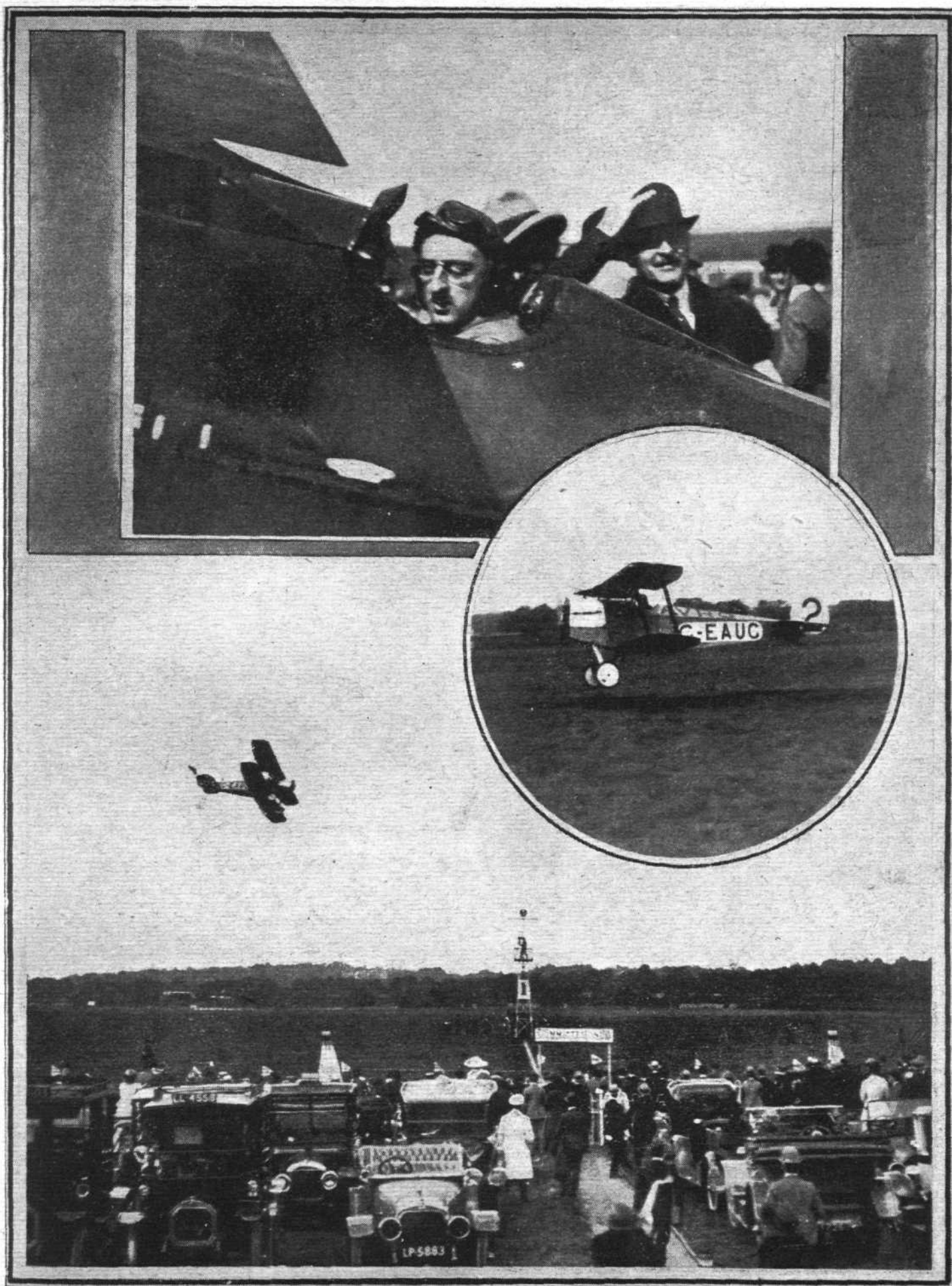
Doubtless the decision noted is mainly a result of the recent report of the Advisory Committee on Civil Aviation, which urged that the comparative failure of the aerial mail service had not resulted from any defect of the service as such, but because of insufficient advertisement; the inconvenience experienced by the public in being unable to post air mail letters except at certain certified post offices, and the prohibitive charges made. We are also inclined to give some of the credit for this more progressive policy to the Press, which has consistently urged the Postmaster-General to adopt a more enlightened view of the possibilities of the new

transport. The plain fact of the matter is that public opinion has been moved to an extent which has made the Post Office authorities "sit up and take notice." However, we are not so much concerned now with motives as with policy. For the latter we have nothing but praise. There is not the slightest doubt about the financial side of the matter when the Post Office adopts such rates as these new ones. The business community is only too anxious to take every advantage of quicker communications, but it cannot be expected to pay prohibitive rates for the convenience. A point which does not seem to have appealed to the authorities until just now is that a business house having relations with France does not send one letter a week—the number may run into hundreds. Even a small surcharge may make a very substantial addition to the year's postage bill, but when it comes to such charges as half-a-crown per letter the proposition may easily mean an addition of many hundreds per annum and be quite impossible.

We must be thankful for the mercies which are vouchsafed to us, but without any desire to appear ungrateful for what is really a very handsome concession, we still look forward to the time, in the very near future, when all first-class mail matter between England and France, Belgium and Holland, as well as between the more remote cities of the United Kingdom, will be automatically carried—at the present fees it should be so carried now—by airship or aeroplane at ordinary postal rates. On the figures which are available there is no reason in the world why it should not be and pay a substantial profit into the bargain. However, we cannot have everything all at once, and must rest content with what we have for the moment. The matter, nevertheless, must not be allowed to drop out of sight, and those who are anxious for progress must continue the mild agitation which has had its first result in the reduction of the Anglo-French postage rates.

American Air Mail Contracts

The Washington Government Printing Office has sent us the conditions on which the United States' Postmaster-General is inviting tenders for the carriage of mails by aeroplane or seaplane. These conditions strike us as being eminently reasonable, and might well be taken as a pattern by our own authorities. They do not, for example, contain such stipulations as those governing the tenders for the Dutch service, in which the postal authorities insist that, in case of failure of machines, the contractor must hire other means of transport, and in addition be penalised for lateness of arrival. The American Post Office appears to be actuated by a sincere wish to encourage and foster civil aviation and to work on the assumption that, in the case of a new transport, some latitude must be allowed in the initial stages. It will not pay for uncompleted trips. That is logical and not unfair. It allows 15 per cent. of uncompleted trips without extra penalty, and for each failure in a month over that percentage it exacts a penalty of twice the pay for a completed trip, which does not strike us as being outrageous. But the conditions are even better than they appear in this direction, for the Post Office will pay, in the case of an uncompleted trip, pro rata for the air-line distance between stated stations provided that the mail reaches the post



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THE AERIAL DERBY : At top, Mr. F. T. Courtney, the Derby winning pilot, who took Mr. Raynham's place in the 300 Hispano-Suiza-engined Martinsyde "Semi-Quaver." Centre, The "Semi-Quaver" takes off for the race; and below, Capt. Hamersley, who was first in the Handicap, passing the winning-post on the 35 Green-engined Avro "Baby" (No. 2), crossing the winning line in front of the Hendon Aerodrome enclosures

office or offices for which it is destined not later than it would have arrived had it been sent by train. For each trip, in excess of 10 per cent. of the schedule trips in a month, on which the mail is delayed beyond the time it would have arrived had it gone by train, twice the pro rata pay of the uncompleted portion of the trip may be deducted. For repeated delinquencies, enlarged penalties proportionate to the nature of the delinquency and the importance of the mail may be deducted.

There are other conditions as to arrival to schedule time for the issue by carrier and penalties for lack of diligence on the part of the contractor. Also, penalties are provided for allowing mails to become wet or damaged, or to suffer loss through depredations while in the custody of the contractor, but these are



R.A.F. Officers' War Medals

THE Secretary of the Air Ministry announces that Medal Rolls of those who have qualified for the British War and Victory Medals are in course of preparation.

Demobilised and invalided officers of the Royal Air Force are requested to write to the Secretary (S.7 Medals), Air Ministry, Kingsway, W.C.2, as soon as possible for the necessary form of application, in order that their claims may be considered.

Medal Rolls in the case of airmen are being prepared from their documents at the Royal Air Force Record Office, and no application on their part is necessary.

Another Zepp. Surrendered

QUIETLY and without any preliminary announcement the "L.64," the second and smaller Zeppelin to be surrendered by Germany to Great Britain under the Peace Treaty, arrived at Pulham on July 22. Leaving Ahlorn at 9.30 p.m. the previous day the airship had to make her way through heavy rain and against a strong wind. Crossing the British coast at the Wash, she reached Pulham at 7.15 a.m., and made a perfect landing, the 400 soldiers hauling down the big ship quite easily. The vessel was in charge of the German captain and crew of 21 which had brought over the "L.71."

The "L.64," which was designed for high altitude bombing, is 640 ft. long, and is fitted with five 260 h.p. engines. Her gross lift is said to be approximately 60 tons, and she has a range of about 4,000 miles at a cruising speed of about 45 m.p.h.

The surrendered airship was received by the Air Commodore in charge of Howden station, the officer in charge at Pulham, and representatives of the Air Ministry.

It appears that on the way over the wireless aerial was lost, but with the aid of an improvised aerial communication was maintained with Pulham throughout the voyage.

King Albert's Aeroplane

THE aeroplane presented by the Handley Page Co. to King Albert of Belgium some time ago, and which has been re-fitted to King Albert's requirements, was flown on July 23 from the Handley Page Aerodrome, Cricklewood, to Brussels, under the charge of Maj. Foote. The machine, a two-seater Bristol fighter, has been tastefully upholstered and fitted with an automatic folding desk, in addition to a set of drawers roomy enough to carry the King's personal travelling effects. The exterior has been finished in the best style of the coach-maker's art, with the Belgian Crown and the initial "A" emblazoned on the side of the machine. A Rolls-Royce Falcon engine is fitted, and the aeroplane has been tested up to a speed of 122 miles per hour at an altitude of 5,000 ft.

The Relief of Rumeitha

IN his statement in Parliament dealing with the relief of the Rumeitha garrison on the Lower Euphrates, Mr. Churchill said the relief force on July 19 encountered strong opposition about 4 miles north-west of Rumeitha. He went on: "The enemy were bombed and machine-gunned by aeroplanes with effect, and were observed to suffer many casualties. The enemy during the night evacuated their position and retired to an embankment 1,000 yards south. The column, continuing its advance on the 20th, passed through the evacuated positions, and parties of the enemy retiring hastily were pursued by the troops and bombed and machine-gunned from the air. On the afternoon of the 20th the relief column reached Rumeitha with very little resistance. The garrison about which so much anxiety was felt is now relieved."

all ordinary provisions of a precautionary character, such as any reasonable tenderer would expect to find in his contract. The main point that appeals to us is, as we have said, the manifest willingness of the United States Post Office to make due and fair allowance for the possible shortcomings of a method of transport which is on its trial, and the lack of a tendency to exact too stringent penalties in case of failure through causes which are beyond the control of the contractor. At the same time, the conditions are drawn with a due regard to the safety of the mails and the convenience of the public. They may not be ideal throughout, but they are certainly conceived in a broad-minded manner, and are as elastic as is right in the case of a public service.

Aerodromes and Landing Grounds

AS Notice to Airmen No. 81, the Air Ministry has issued a list of aerodromes and landing grounds which are available for civil aircraft, corrected up to July 1, 1920. The list is too long to reproduce in FLIGHT, but copies may be obtained or consulted at the Air Ministry, Kingsway, W.C. 2.

R.A.F. in Mesopotamia

IN a written answer to a question by Lieut.-Col. Burgoyne on July 26, as to the number of troops in Mesopotamia, Mr. Churchill said "There are two squadrons of the Royal Air Force, and an additional squadron is in the process of formation at Basra. The senior Royal Air Force officer is responsible to the General Officer Commanding-in-Chief for carrying out any air operations required. Proposals to increase the number of squadrons of the Royal Air Force in Mesopotamia and reduce the military garrison are being considered, but I cannot say at present when a decision will be reached."

Seaplane v. U. Boat

IN the Prize Court on Tuesday, the President (Sir Henry Duke), in awarding the sum of £150 for the destruction of the German submarine U.C.70 said this was one of the most efficient services of the War, and one of the most striking. Lieut. Walter Thomas Arthur Bird, D.S.O., in command of H.M.S. Oise on August 28, 1918, said that off Kettleness, with H.M. Seaplane 9983, under Lieut. Edmund Francis Waring, D.F.C., R.A.F., pilot, the German submarine U.C.70 was crippled by bombs and depth charges, and all her crew of thirty destroyed.

Divers salvaged parts of the submarine. The seaplane, by Very lights, located through the engagements the positions of the submarines.

Lieut. Parer's Misadventures

ILL-LUCK continues to follow Lieuts. Parer and McIntosh in their endeavours to fly to Australia. They had hoped to arrive at Port Darwin on July 27, but a message from Batavia states that when landing at Grisseek on the morning of July 24, the pilot failed to notice a beam on one side of the ground. The machine tipped up on her nose, and was seriously damaged, the propeller being smashed.

Another U.S. Airship Wrecked

THE airship section of the U.S. Navy is having an unlucky time. The C. 10—of the Blimp type—which had a naval crew and three newspaper correspondents on board, while following the race between Shamrock and Resolute on July 21, fell from a height of 1,000 ft. into Jamaica Bay and was completely wrecked. No one was injured.

A Lake Discovered in Panama

IN the course of a reconnaissance flight recently two U.S. military aeroplanes belonging to the 7th Aero Squadron reported having seen a lake in the mountains north of Anton, R.P. The lake is not shown on any maps, and is the first freshwater lake to be discovered in Panama; it is located about 15 miles west of Chame Bay and 8 miles from the Pacific Coast.

Aviation in Peru

ANNOUNCEMENT has been made of the establishment of the first civilian commercial aviation school at Lima, an American-Peruvian company having been formed, with a capital of £10,000. Three pilots and eight Curtiss planes have already arrived, and work on the aerodrome has begun.



The Nieuport "Mascot"

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TAKING it all round the Fifth Aerial Derby, which was flown last Saturday, was even more successful than its predecessors, if not so much from the spectacular point of view as from the technical aspect, disclosing as it did that further progress has been made since last year's Derby. Not only

winning machine—an average of 153.45 m.p.h.—the outstanding feature of the race was undoubtedly the magnificent performance of the small, low-powered type of aeroplane, which once again, but with greater emphasis, demonstrated its ability successfully to compete with high-powered high-



AERIAL DERBY, 1920 : Line up of the Competitors ready for the start

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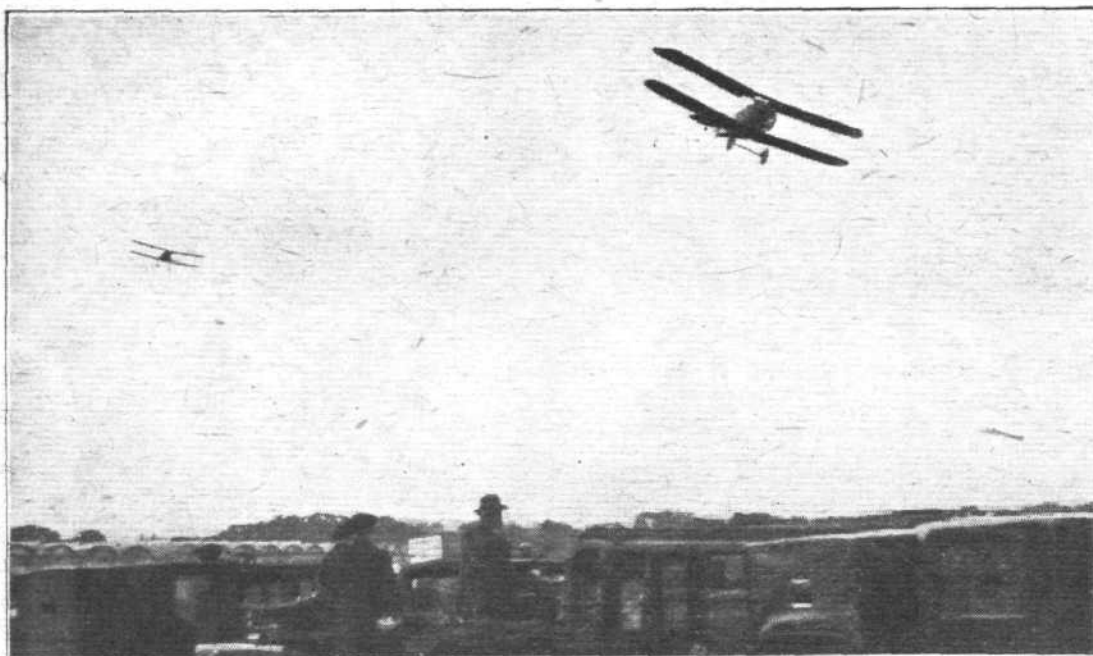
was the highest speed attained over the course—which was some 15 miles longer—considerably greater, but there was, we think, an indication of improved reliability. Whereas last year seven out of twelve starters completed the course, this year there were fourteen starters, out of which nine got home. Apart from the remarkably high speed of the

speed machines. In fact, to our way of thinking, it is the most important and useful demonstration in recent aeroplane performance that has come to light, as it proves beyond doubt that the "popular" type aeroplane, costing no more to buy, run and maintain than a small car, is a reality within the reach of, at any rate, those who can afford a car.



Hawker gets away in the Sopwith A.B.C. for the Aerial Derby

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Two of the Sopwith Snipes completing the first lap in the Aerial Derby. No. 6 leading No. 5—emphasising the absolute regularity of these fast flyers

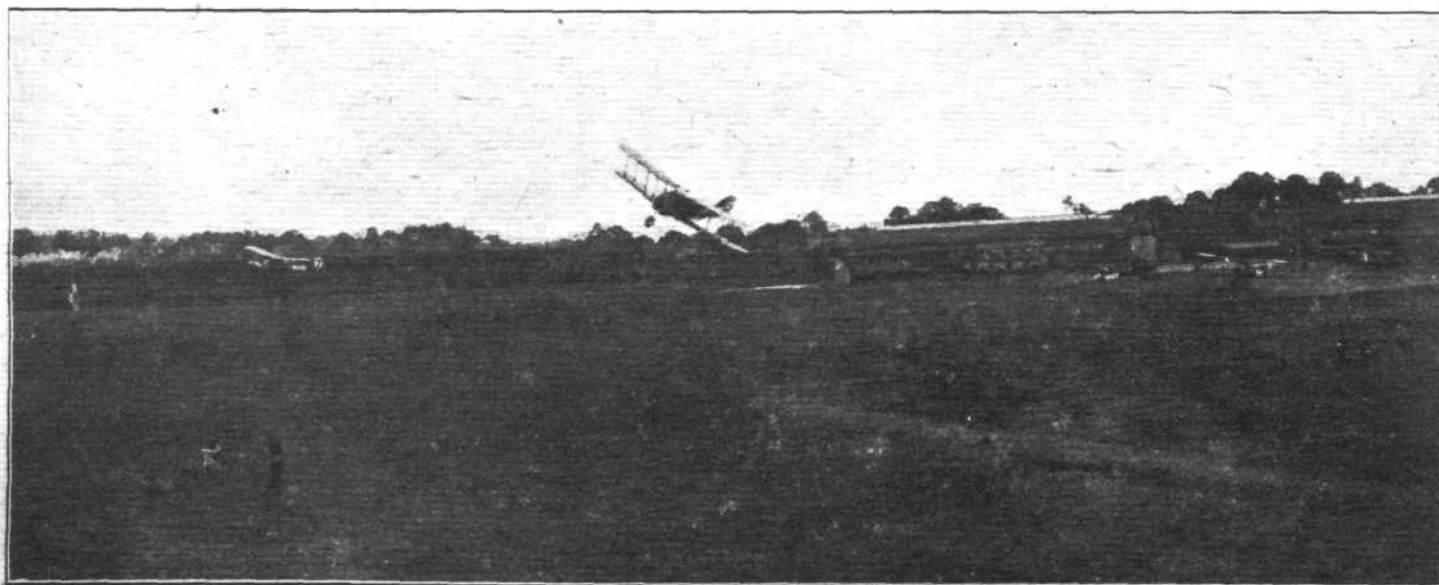
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The "gate" at Hendon, though not so large as that on the occasion of the R.A.F. Aerial Pageant, was very good, and as usual the "free enclosures" all along the route were well patronised. Many notabilities were at the aerodrome, and representatives from many foreign countries—including a detachment of Boy Scouts from Denmark—were amongst the most interested spectators. "Bookies" were also very much in evidence, and it is to be regretted that some of these had sudden urgent engagements elsewhere which "necessitated" their departure before the finish of the race. They left their cards—but not their addresses; but fortunately, thanks to the promptitude of the Royal Aero Club, we understand that their photographs have been forwarded to the proper quarters, and "developments" may follow.

Although weather conditions were unpromising early in the day, they were not too bad by the time the race started, and improved considerably towards evening. The wind, low down, was inclined to be somewhat squally and changeable, and troubled the competitors just a little now and again. At 2.15 p.m. sharp, Bert Hinkler, on his London-Turin Avro Baby (35-h.p. Green), got smartly away on the fall of Mr. George Reynold's flag. As he passed over the sheds he got one or two very nasty bumps and bobbed about somewhat alarmingly. Seven minutes later Capt. H. A. Hamersley departed on a similar, but newer, machine, the improved performance of which was at once apparent as she started off on her journey. The next on the list was

Leth Jensen—the only foreign entrant—on the Spad S.29, but unfortunately this was a non-starter. There was, therefore, a somewhat long interval before the next machine got away an hour later (3.15—3.30 p.m.). This interval, however, was filled by a parachute ("Guardian Angel") descent by W. Newall from an Avro, piloted, we believe, by an old friend, Maj. R. H. Carr. This third starter was the "Airco" 14A (450-h.p. Napier "Lion"), piloted by F. S. Cotton, who carried Mr. Harwood as passenger—the only one in the race. The D.H. took off in magnificent style, climbing rapidly for some time. About 15 minutes later the three Sopwith "Snipes," piloted by Capt. W. L. Jordan, and Flight-Lieuts. W. H. Longton and S. F. Fall respectively started off in a bunch. This was quite an imposing getaway, Jordan, being on the "inside," gaining slightly by banking sharply to the left and straightaway heading for Brooklands, and No. 7, Fall, following him with a wider sweep. No. 6, Longton, lost a few seconds in getting away. Eight and a half minutes later Capt. Westgarth-Heslam on the Avro "Schneider" (230-h.p. Siddeley "Puma") hustled away with a good turn of speed that looked like business.

In the meanwhile someone put up some "slow flying" and stunting on a "pre-War" type Bristol Scout, and sundry Avros, presumably taking up passengers, ambled about. At about 4.38 p.m. Hamersley completed his first circuit, and after making a circuit of the aerodrome, according to rules, started on his second round. Hinkler came in about half a minute later, and got away on the second circuit



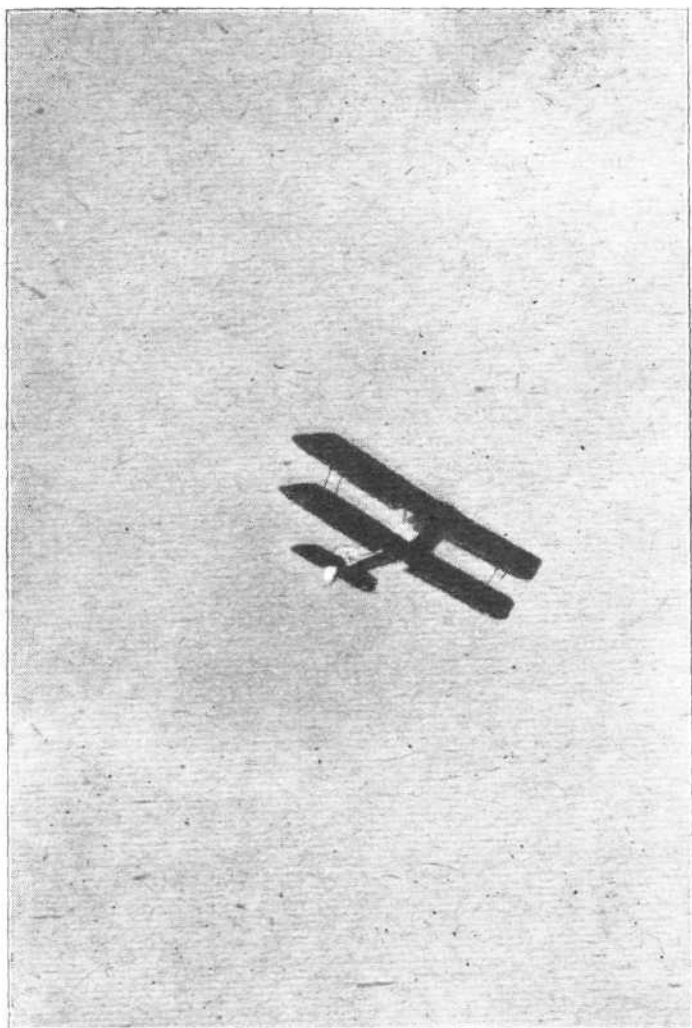
The three Sopwith "Snipes" start for their turn in the Aerial Derby

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without incident. Then at intervals of a few minutes the rest of the competitors got away. James on the Nieuport "Nieuhawk," owing to an overflow of petrol, was late in starting his engine, and the two Martinsydes (R. H. Nisbet, F.6, and T. O'B. Hubbard, F.4) got off before him. The last two, F. T. Courtney—who deputised for F. P. Raynham

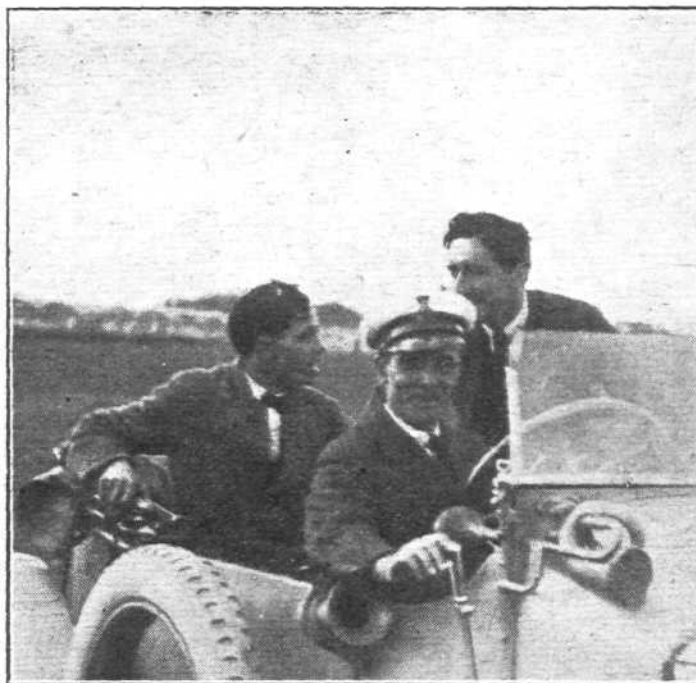
as the latter had hurt his arm the previous Sunday—on the Martinsyde "Semi-Quaver" and Tait-Cox on the Nieuport "By Goshawk" were gone before you could say "Jack Cates."

Now they were all away we settled down to await the arrival of the remaining first lappers. At 4.10 Cotton on the "Air-Cow" came in fairly high, and was soon off again. He was followed ten minutes later by Hubbard on the



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The Martinsyde "F.4" (No. 12) passes over Hendon Aerodrome after the first lap for the Aerial Derby



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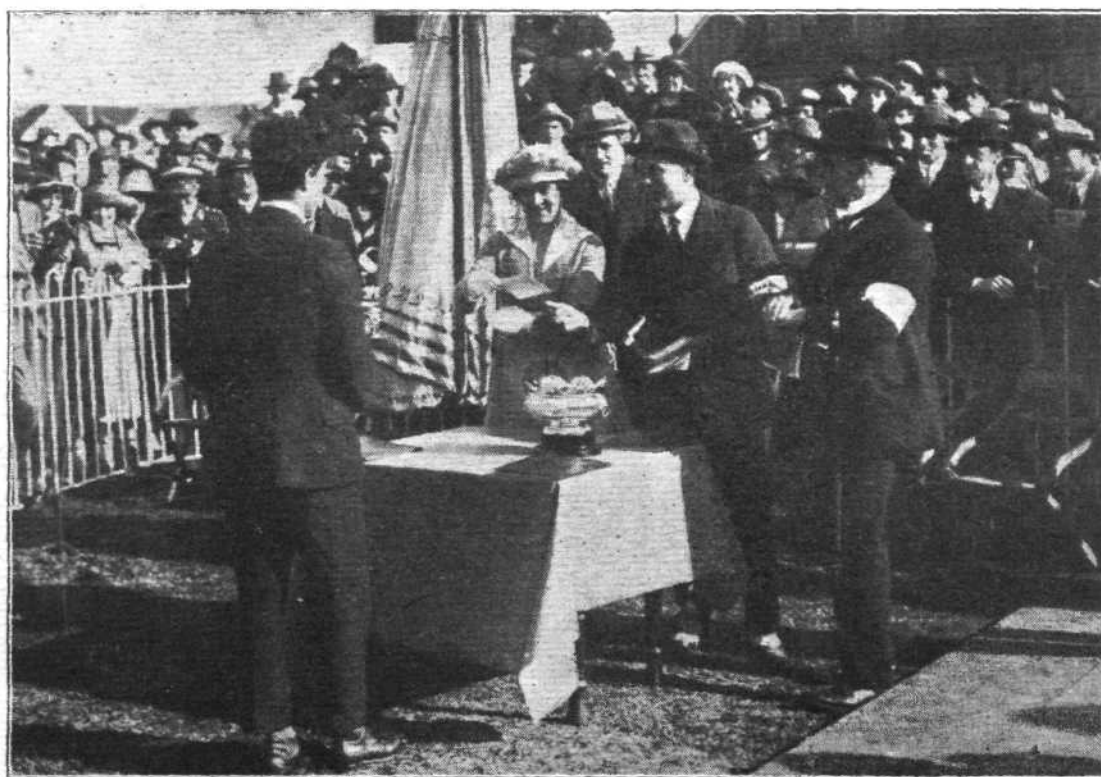
Capt. Hamersley and Mr. Hinkler (on left), the two Prize "Baby" pilots, get aboard for their run up and down in front of the enclosures at the Aerial Derby

Martinsyde. Two "Snipes" came in next, Longton leading Jordan by a few seconds.

James on the "Nieuhawk" crossed the line seven minutes later, at a good turn of speed, and to the dismay of all, after completing one circuit of the aerodrome, rattled off a second before he started on his final lap round London, thus falling behind Hawker, who came in about half a minute behind him. The second Martinsyde, piloted by Nisbet, crossed the line on his first lap at 4.31. Presently a small machine appeared above the horizon, and many expected it to be

Capt. Hamersley, the winner on the Green-engined Avro Baby No. 2, receiving the Aerial Derby Cup from Lady Sykes. Comdr. Perrin, Gen. Sir Capel Holden and Gen. Sir S. H. Sykes are on the right

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Capt. Hamersley leads the claps for Hinkler as he comes in second, the perennial Mr. Withers being on his left

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Heslam on the Avro, who was long overdue and had not been heard of since passing Brooklands. However, a flash of red round the pylons proved it to be Courtney on the Martinsyde "Semi-Quaver." Many expected Tait-Cox following close on his tail, but when the next machine turned out to be Uwins on the Bristol, it was seen that the scratch man must have come to grief somewhere. This proved to be the case, for we learned later that he was forced to land

at Brooklands on the first lap. All still in the race having now completed their first lap, we waited for the winners. We did not have to wait long, for at about 5 o'clock the unmistakable form of a "Baby" came into view. This turned out to be Hamersley, who, as soon as he crossed the line, lost little time in landing, to the accompanying cheers from the onlookers. He, together with Mr. Fred May, of the Green Engine Co., were immediately mobbed by an



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THE AERIAL DERBY : Above, the busy "bookies," and below, the "poor but respectable" bookmaker sports a car for his stand. Several "Welshers" are reported to have carried out the usual vanishing-trick quite successfully

enthusiastic crowd of well-wishers, and congratulated on having once again pulled off the Aerial Derby Handicap 1st Prize.

When a second "Baby" hove in sight some five minutes later, there was considerable rejoicing, for these little 'buses had undoubtedly won the hearts of all—as well as first and second places in the handicaps. Just as Hinkler landed, Newall made a second parachute descent from an Avro, this time dropping in a second parachute from the first one when the latter had fallen a short distance.

In ten minutes' time another machine approached the aerodrome, and as it drew near we recognised Hawker's Sopwith. To everyone's surprise, instead of making the required half-circuit of the aerodrome, Hawker flew straight into the aerodrome past No. 1 pylon, but not across the line. It was obvious by his time of arrival that he would have found a place in the handicap, so there was much disappointment at his not finishing correctly. On landing he said he thought the finish was the same as last year's, hence the mistake. Well, Hawker, do not have No. 13 next time! About two minutes after Hawker came Courtney, and the smile on Raynham's face was good to see, for there was little doubt that the "Semi-Quaver" had won first place in the Derby. It was then that the only unpleasant incident in the day's successful proceedings (at the 'drome, that is) occurred. Courtney was just about to land—and had, in fact, already touched the ground—when the machine suddenly bounced into the air, struck the ground with the lift wing tip, and turned completely over. It was a horrible moment, and we can never remember having experienced a greater feeling of relief than we did when we saw some six foot or so of Courtney worm itself out from the letter-box-like opening between the ground and the machine, apparently but little hurt. A simultaneous burst of cheering greeted his appearance, not only from the enclosures but from the distant surrounding hills which were crowded with people. Later enquiries revealed the fact that, bar a shaking and a few cuts, he was none the worse for his spill, which was caused primarily by the bad bit of ground on which he landed and by being partially blinded by the sun and steam from the radiator.

In the meanwhile James arrived home, and in landing just managed to miss the crowd of busybodies streaming across the ground towards the Semi-Semiquaver. A lonely "Snipe," piloted by Jordan, came along next and just managed to cross the line and land at the far end of the aerodrome before he ran out of petrol. Nisbet, on the Martinsyde F.6, and Uwins, on the Bristol, followed at short intervals, and at about 5.30 Hubbard, on the remaining Martinsyde, brought his exceptionally plucky and sporting effort to a close with a really fine landing in the worst part of the ground.

Considering that the last-named competitor is one of our pioneers in flying (dating back to 1911), and by no means as young as the majority of his rivals, his performance in the race is one of no minor merit. After waiting about on the off-chance of some of the other competitors arriving, we eventually ascertained that all were either down or in, so, taking the hint from Hawker and Uwins, who flew home on their respective machines, we did likewise—only on a motor 'bus.

An innovation in the organisation of the Turning Point arrangements was the fitting of Field Service Telephones. This was carried out at very short notice by the London Telephone (New System) Co., Ltd., and enabled the official observers at all Turning Points to be in direct communication with the Judges' Box at Hendon throughout the race.

The four machines out of the fourteen starters that failed to complete the two circuits are accounted for as under. Tait-Cox did not get far before he experienced trouble, which necessitated a landing at Brooklands. Cotton, on the Airco 14A, however, all but completed his second lap, when the petrol pipe started a leak just as he was nearing the final turning point at Hertford. This caused a fire, and on landing the machine fouled some telegraph wires, and rather badly crashed into a field. Cotton was uninjured, but his passenger was slightly injured, and had to be removed to Hertford Hospital. Lieut. Fall had to land at Epping on the first lap, but Lieut. Longton, who was leading Jordan, carried on until the second lap.

Capt. Westgarth-Heslam, on the Avro Schneider, was doing excellent time until soon after he passed W. Thurrock, when he experienced trouble with the petrol supply and had to come down at Abridge.

RESULTS OF FIFTH AERIAL DERBY AT HENDON, JULY 24, 1920

No.	Pilot.	Machine.	Engine.	Handicap Allowance.	Time of Starting.	First lap.		Second lap.		Total Time.	Speed.	Handicap Time.	Position.	
						Flying Time.	Speed.	Flying Time.	Speed.				Fastest Time.	Handicap.
1	Hinkler	Avro "Baby"	35 Green	h. m. s. 1 41 0	h. m. s. 2 15 0	h. m. s. 1 23 33½	m.p.h. 71.81	h. m. s. 1 22 12½	m.p.h. 72.98	h. m. s. 2 45 46	m.p.h. 72.39	h. m. s. 1 4 46	8	2
2	Hammersley	Avro "Baby"	35 Green	h. m. s. 1 34 0	h. m. s. 2 22 0	h. m. s. 1 16 0	78.94	h. m. s. 1 16 6	78.84	h. m. s. 2 32 6	78.89	h. m. s. 0 58 6	7	1
3	Jensen	Spad 29	80 de Rhone	h. m. s. 0 45 0	N.S.	0 55 13½	108.63	Down	111.29	h. m. s. 1 47 47½	111.33	h. m. s. 1 19 47½	6	5
4	Cotton	D.H. 14A	450 N.L.	h. m. s. 0 40 30	h. m. s. 3 15 30	0 53 53	111.35	0 53 54½	130.15	h. m. s. 1 30 27½	132.67	h. m. s. 1 18 27½	2	4
5	Jordan	Sopwith "Snipe"	200 B.R. 2	h. m. s. 0 28 0	h. m. s. 3 28 0	0 53 50½	111.45	Down	128.43	h. m. s. 1 33 13½	128.73	h. m. s. 1 21 43½	4	6
6	Longton	Sopwith "Snipe"	200 B.R. 2	h. m. s. 0 28 0	h. m. s. 3 28 0	0 53 50½	111.45	Down	124.13	h. m. s. 1 43 40	115.75	h. m. s. 1 33 10	5	8
7	Fall	Sopwith "Snipe"	200 B.R. 2	h. m. s. 0 28 0	h. m. s. 3 28 0	0 53 50½	111.45	Down	142.18*	h. m. s. 1 23 43*	143.34*	h. m. s. 1 14 43*	3	7
8	Heslam	Avro "Schneider"	230 S.P.	h. m. s. 0 19 30	h. m. s. 3 36 30	0 44 21½	135.28	0 46 6	130.15	h. m. s. 1 18 12½	153.45	h. m. s. 1 17 12½	1	3
9	James	Nieuport "Nieuhawk"	320 A.B.C.D.	h. m. s. 0 12 0	h. m. s. 3 44 0	0 46 30	129.93	0 46 43½	128.43	h. m. s. 1 33 13½	128.73	h. m. s. 1 21 43½	4	6
10	Nisbet	Martinsyde "F.6"	300 H.S.	h. m. s. 0 11 30	h. m. s. 3 44 30	0 52 20½	108.43	0 48 19½	124.13	h. m. s. 1 43 40	115.75	h. m. s. 1 33 10	5	8
11	Hubbard	Martinsyde "F.4"	300 H.S.	h. m. s. 0 10 30	h. m. s. 3 45 30	0 41 31	144.52	0 42 12*	142.18*	h. m. s. 1 23 43*	143.34*	h. m. s. 1 14 43*	3	7
12	Hawker	Sopwith "A.B.C."	320 A.B.C.D.	h. m. s. 0 9 0	h. m. s. 3 47 0	0 48 46	123.04	0 44 4	130.15	h. m. s. 1 32 50	129.26	h. m. s. 1 25 20	3	7
13	Uwins	Bristol "Bullet"	450 B.J.	h. m. s. 0 7 30	h. m. s. 3 48 30	0 39 25	152.22	0 38 47½	154.70	h. m. s. 1 18 12½	153.45	h. m. s. 1 17 12½	1	3
14	Courtney	Martinsyde "Semi-Quaver"	300 H.S.	h. m. s. 0 1 0	h. m. s. 3 55 0	Down	152.22	0 38 47½	154.70	h. m. s. 1 18 12½	153.45	h. m. s. 1 17 12½	1	3
15	Cox	Nieuport "Goshawk"	320 A.B.C.D.	Scratch	h. m. s. 3 56 0	Down	152.22	0 38 47½	154.70	h. m. s. 1 18 12½	153.45	h. m. s. 1 17 12½	1	3

A.B.C.D. = A.B.C. "Dragonfly."
B.J. = Bristol "Jupiter."

S.P. = Siddeley "Puma."
N.L. = Napier "Lion."

N.S. = Non-Starters.
H.S. = Hispano-Suiza.

* Times taken near the line, but Hawker did not cross proper finishing line.

THE MACHINES IN THE AERIAL DERBY

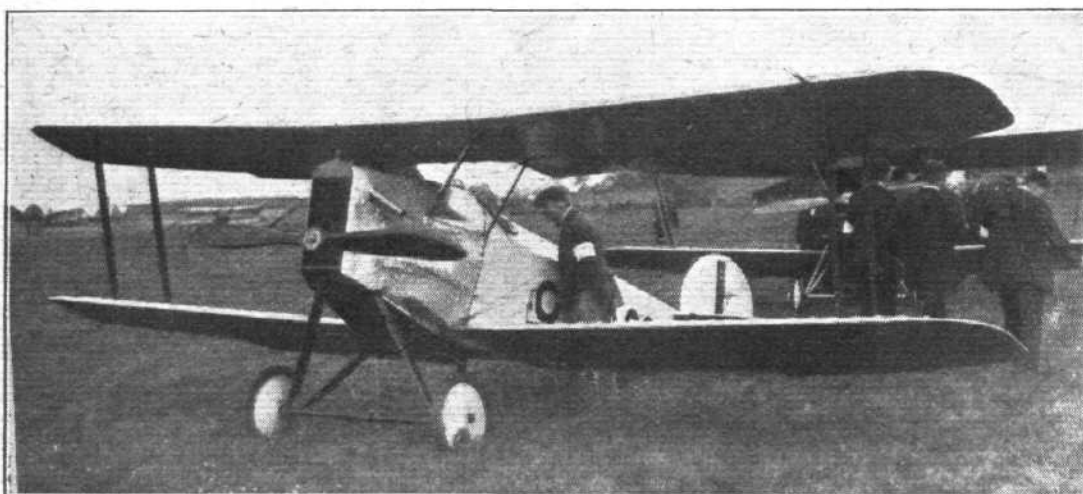
ALTHOUGH the majority of the machines entered for the Aerial Derby will be familiar to most of our readers, a few notes briefly recapitulating the main points of the various designs may not be without interest.

Nos. 1 and 2, the Avro "Babies," 35 h.p. Green Engines

It was, it may be remembered, on an Avro "Baby," 35 h.p. Green engine, that Capt. Hamersley won the handicap of the Aerial Derby of last year. On Saturday last Capt. Hamersley repeated the performance on the same type, although a newer specimen, of machine; while Mr. Bert Hinkler, whose magnificent non-stop flight from London to Turin will still be fresh in mind, also on an Avro "Baby," 35 h.p. Green, obtained second place in the handicap. This is a feat of which all concerned may well be proud, and is one more proof of the excellence of the Avro-Green combination. The machine has shown that a very high-powered aeroplane is not essential to aerial touring, and that, even at the present day, it is possible to produce a machine which will do 70 m.p.h. cruising speed at 1,000 ft., and that for

a petrol consumption of over 30 miles per gallon. This, it will be seen, at once disproves the old contention that flying is necessarily an expensive game, especially bearing in mind that the Green engine in Mr. Hinkler's machine is about 12 years old. By the time one has spread the original cost over that span of time, the engine must be considered cheap, and even if one had worn out, in the meantime, a couple of machines, or even three, the depreciation per year will prove extremely reasonable. One is thus justified in hoping that during the next few years the number of owner-pilots will increase by leaps and bounds, as it most assuredly will once it is thoroughly realised how much quicker and more enjoyable it is to travel by air than by road.

Constructionally the Avro "Baby" is a straightforward, clean, commonsense piece of work, and its merits lie not so much in any striking originality in design as in a happy co-ordination of well-tried details. The engine, although heavy as compared with some of more modern design, gives the machine an excellent performance, while the very fact that it is sturdily built gives it a reliability which cannot



Mr. Hinkler's
Avro "Baby,"
35 h.p. Green
engine (No. 1) in
the Aerial Derby

"Flight" Copyright

The Avro
"Baby," 35 h.p.
Green engine
(No. 2), flown by
Capt. Hamersley
in the Aerial
Derby. This
machine was first
in the Handicap
"Flight" Copyright



The Airco 14A
450 h.p. Napier
"Lion" (No. 4)
flown by Mr. F. S.
Cotton in the
Aerial Derby

"Flight" Copyright

The Sopwith
"Snipe," 200 h.p.
B.R.2 (No. 5),
flown in the
Aerial Derby by
Capt. Jordan
"Flight" Copyright

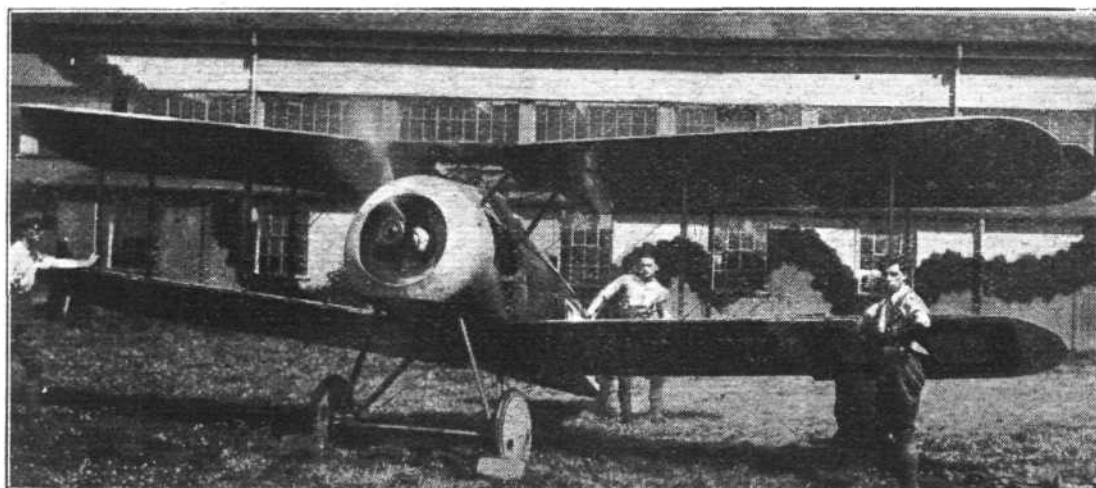


fail to appeal to the private owner for whom the machine is intended.

As the Avro "Baby" lands at about 35 m.p.h., it can be brought into a very small field in safety, as visitors to the Aerial Derby must have realised when watching the excellent landings made by Hinkler and Hamersley. After touching the ground the machines only ran along a few yards before coming to a standstill. At the same time, the maximum

which could be used with advantage as a long-range bomber. It was very unfortunate that a broken petrol pipe should have caused it to come to grief, as otherwise there is no doubt the machine would have given a good account of itself in the race.

We extend to Mr. Cotton our sympathy, and trust that when the machine is repaired he will yet be able to make good use of it in other directions.



The Sopwith
"Snipe," 200 h.p.
B.R.2 (No. 6),
flown by Lieut.
Longton in the
Aerial Derby
"Flight" Copyright

speed is 80 m.p.h., which is quite fast enough for all ordinary purposes to which the private owner who decides to use one of them for touring, is likely to put the machine.

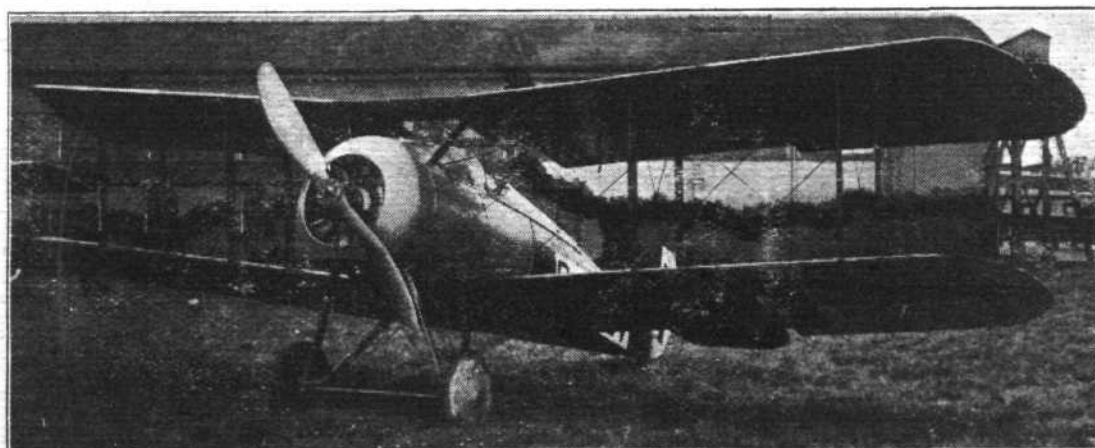
**No. 4, the De H. 14A,
450 h.p. Napier "Lion" Engine**

This machine, by far the largest in the race, was originally designed as a long-distance, moderate speed aeroplane,

In its present form the Airco 14A has a petrol capacity of 390 galls., or sufficient for a flight of about 1,600 miles. As originally designed, there were two additional tanks, which brought the petrol capacity up to 600 galls. This, it is estimated, would be sufficient for a flight of about 2,400 miles.

In spite of its large size the machine has a speed at 10,000 ft. of about 114 m.p.h. with full load, so that for

The Sopwith
"Snipe," 200 h.p.
B.R.2 (No. 7),
flown by Lieut.
Fall in the Aerial
Derby
"Flight" Copyright





The Avro
"Schneider,"
230 h.p. Siddeley
"Puma" (No. 8),
flown by Capt.
Westgarth-Hes-
lam in the Aerial
Derby
"Flight" Copyright

long-distance work it will have a cruising speed sufficiently high to make good headway against any wind likely to be encountered. The span is 50 ft. 5 ins., and the total wing area 618 sq. ft.

**Nos. 5, 6 and 7, the Sopwith "Snipes,"
200 h.p. B.R.2 Engines**

The entry of the three Sopwith "Snipes" was, perhaps, the most sporting of all in the race, one of them being entered by its owner and pilot, Lieut. Fall, and the other two by private owners. It was therefore somewhat of a disappoint-

a certain "Snipe" squadron accounted for 36 enemy aeroplanes in four days, and downed 13 in one day.

In its general lines the Sopwith "Snipe" follows standard Sopwith practice, and is, perhaps, more like the famous Sopwith "Camel" than any other member of the Sopwith tribe. As it was designed for fighting—carrying two machine guns—its fuselage has a "hump" which really out-camels the "Camel." It is, however, a larger machine than the "Camel," and has two pairs of interplane struts on each side. Its speed at ground level is somewhere in the neighbourhood of 130 m.p.h.

The Nieuport
"Nieuhawk,"
320 h.p. A.B.C.
"Dragonfly"
(No. 10), piloted
by Mr. J. H.
James in the
Aerial Derby
"Flight" Copyright

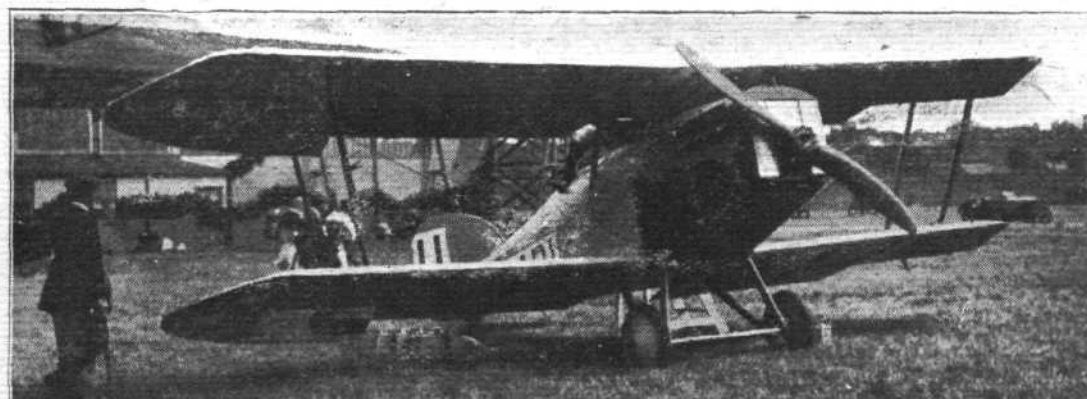


ment that none of them obtained a place in the handicap. The way in which Nos. 5 and 6 came in after the first lap within about 10 seconds of one another proved that both pilots had kept a good course, and one wished them better luck than that which befell them.

The Sopwith "Snipe," it may be remembered, was first produced in 1917, but did not begin to come along in quantities until about the middle of 1918, so that it had short time in which to prove its merits. During that time, however, it made a very good reputation for itself, and one recalls how

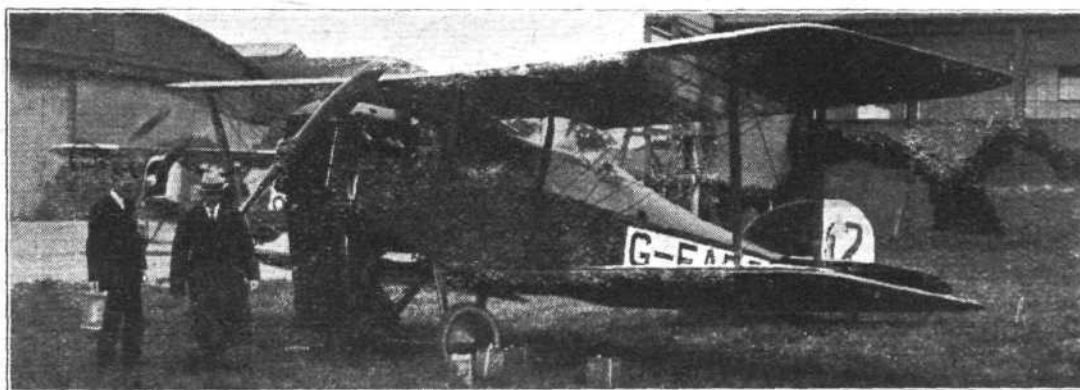
**No. 8, the Avro "Schneider"
230 h.p. Siddeley "Puma" Engine**

The machine flown by Capt. Westgarth-Heslam was the "Schneider" seaplane of last year, fitted with a V undercarriage and the usual tail skid. In comparison with other Avros, which are usually characterised by a relatively long fuselage, the "Schneider" is very stumpy, the deep front portion of the body rather tending to make it look shorter than it really is. As a land machine its speed was considerably greater than that attained with the floats in place, but



The Martinsyde
F.6, 300 h.p.
Hispano-Suiza
(No. 11), piloted
by Mr. Nisbet
in the Aerial
Derby
"Flight" Copyright

The Martinsyde
 F.4, 300 h.p.
 Hispano-Suiza
 (No. 12), piloted
 by Squadron -
 Leader T. O'B.
 Hubbard in the
 Aerial Derby
 "Flight" Copyright



through engine trouble, necessitating a forced landing *en route* the machine did not get a chance of showing what she can do. Apart from the short deep fuselage, the Avro "Schneider" is characterised by a small lower plane, the interplane struts being sloped outwards to give a better load distribution. The Siddeley "Puma" engine is totally cowled in, with the exhaust pipes enclosed in an aluminium streamline fairing projecting horizontally from the port side. Capt. Heslam's take-off was very good, and the machine

of Mr. Folland's designs, the "Go-hawk" flown by Mr Tait-Cox, the machine has an extremely good performance and is probably nicer to fly. Like its prototype, the "Nieu hawk" has two pairs of struts a-side, making, for such a short span, a very sturdy wing structure. Its fuselage, which is a rectangular section girder, is well streamlined, the circular section necessitated by the radial engine being continued well aft. The engine itself is well cowled in, and a very good entry for the air is provided by the spinner-shaped wooden



The Sopwith
 A.B.C., 320 h.p.
 A.B.C. "Dragon-
 fly" (No. 13),
 piloted by Mr.
 H. G. Hawker in
 the Aerial Derby
 "Flight" Copyright

appeared to be quite fast, so one was not a little disappointed when it failed to come back to Hendon.

No. 10, the Nieuport "Nieuhawk,"
 320 h.p. A.B.C. "Dragonfly" Engine

The Nieuport "Nieuhawk" is very similar to the racer flown by Mr. Tait-Cox in last year's Aerial Derby, and bears a strong family resemblance to the well-known Nieuport "Nighthawk." Its aerodynamic qualities as well as its detail construction have received most careful attention by its designer, and although not quite so fast as the other

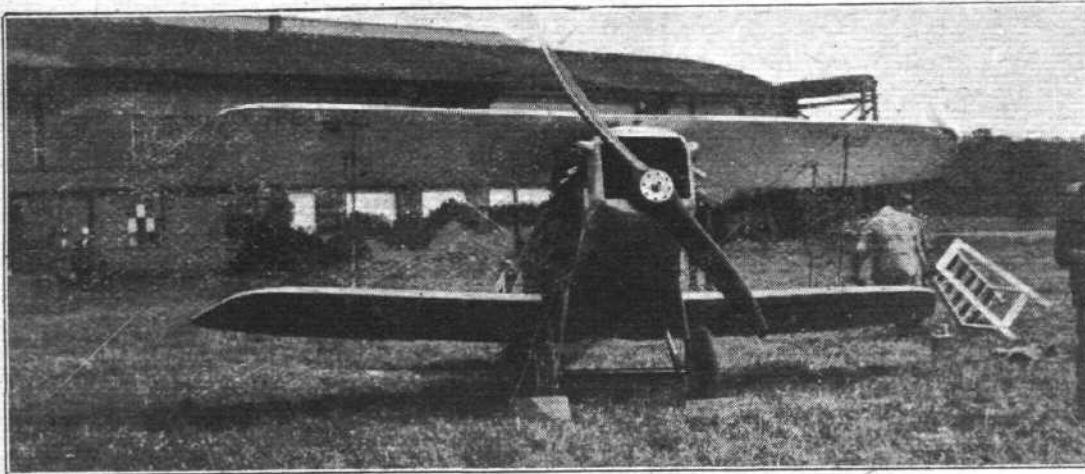
extension of the propeller boss, which carries the lines smoothly into those of the aluminium cowl. The yellow and blue check painting used as the Nieuport racing colours lends the machine quite a distinctive appearance, and makes it easily recognised.

No. 11, the Martinsyde F.6,
 300 h.p. Hispano-Suiza Engine

This machine is a development of the famous Martinsyde F.4, and differs from that machine chiefly in having a seat for a passenger. In other respects it is true to type, and has

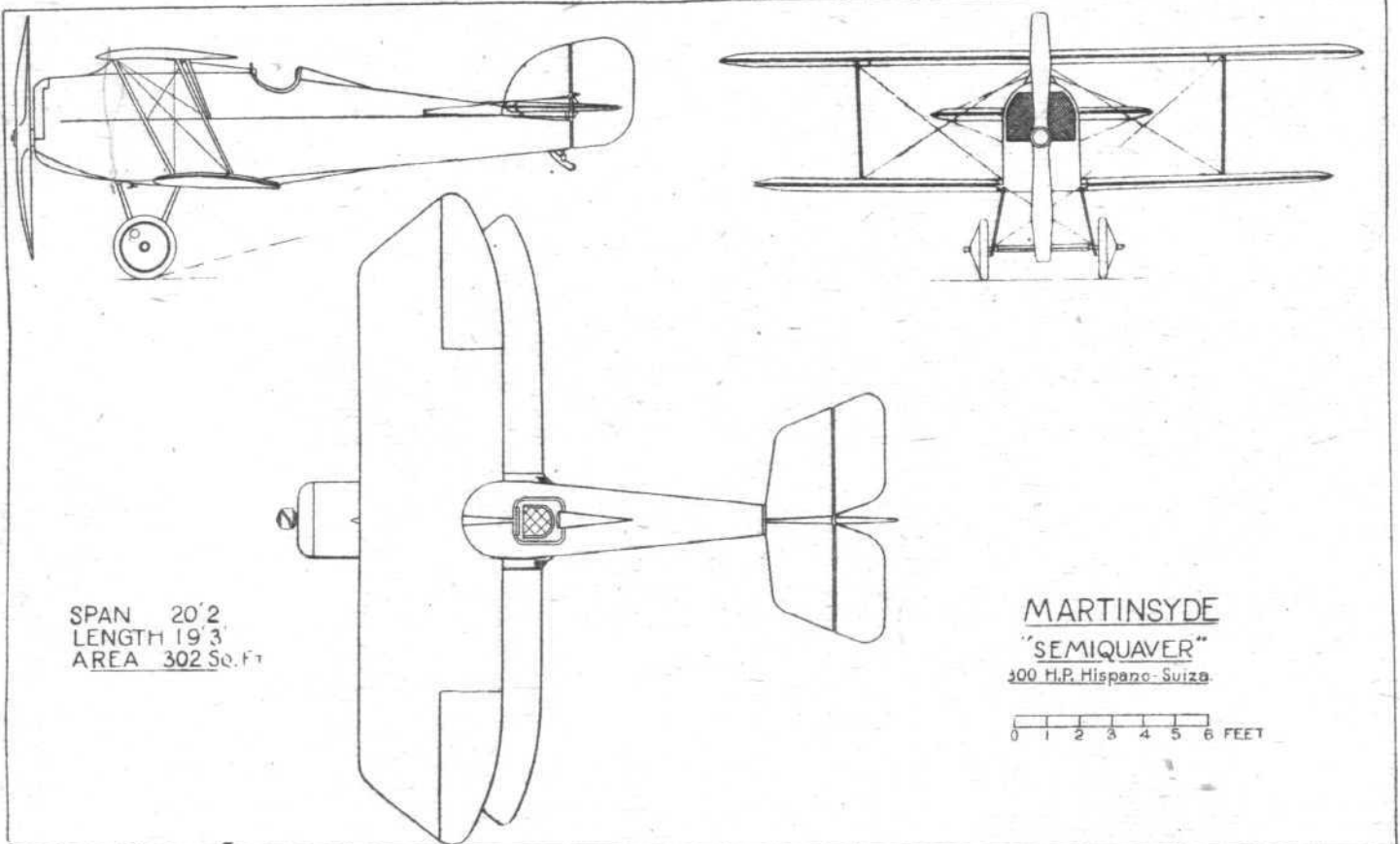
The Bristol
 "Bullet," 450
 h.p. Bristol
 "Jupiter" (No.
 14), piloted by
 Mr. Uwins in the
 Aerial Derby
 "Flight" Copyright





The Martinsyde
"Semi-Quaver,"
300 h.p. Hispano-
Suiza (No. 15),
piloted by Mr.
F. T. Courtney in
the Aerial Derby.
This machine
won the Derby
(fastest time)

"Flight" Copyright



"Flight" Copyright.

THE WINNER OF THE AERIAL DERBY, 1920: The Martinsyde "Semi-Quaver," 300 h.p. Hispano-Suiza engine. Plan, side and front elevations, to scale

The Nieuport
"Goshawk,"
320 h.p. A.B.C.
"Dragonfly"
(No. 16), piloted
by Mr. Tait-Cox
in the Aerial
Derby. This
machine is the
holder of the
British speed
record of 166.5
m.p.h.

"Flight" Copyright



the unmistakable Martinsyde touch about it which makes these machines some of the prettiest in the world. The wings are heavily staggered, and have raked wing tips, both features which tend to improve the appearance of the machine.

No. 12, the Martinsyde F.4, 300 h.p. Hispano-Suiza Engine

This is the standard Martinsyde "Buzzard," which was designed and built in 1918, and first tested in June of that year. She was designed with the purpose of beating all performances of every other machine of that time, and but for the fact that the Armistice came along before the F.4 could be produced in quantities, there is little doubt that she would soon have become one of the most famous machines of her size in the world. Her speed at ground level is somewhere in the neighbourhood of 145 m.p.h., which is well above the average for that power loading (7.5 lbs./h.p.). Her climb to 10,000 ft. takes 6 mins. 40 secs. only.

No. 13, the Sopwith "Rainbow," 320 h.p. A.B.C. "Dragonfly" Engine

Owing to the impossibility of obtaining a Bristol "Jupiter" engine, which was the power plant originally installed in the Sopwith "Schneider" machine entered for that race at Bournemouth last year, a smaller engine had to be used. The one which could be fitted with least trouble was the A.B.C. "Dragonfly," and consequently this was chosen. The lighter weight of this engine permitted of reducing the area while retaining the same landing speed, and consequently slightly smaller wings were fitted. The result was that the speed was still quite good (somewhere in the neighbourhood of 150 m.p.h.). Owing to Hawker misunderstanding his instructions he failed to cross the proper finishing line at the end of the race, and was thus disqualified. This was very hard luck, as otherwise the machine would certainly have obtained a place.

The machine is a very small tractor biplane with vertical wings (no stagger) and a carefully streamlined fuselage, which terminates in front in a cowl over the engine. All control cables pass inside the body to housed-in crank levers, a fact which adds considerably to the neat appearance of the machine. A simple V-undercarriage had been fitted, and in spite of the high landing speed it was noticed that Hawker made very fine landings on a ground which was none too suitable for racing machines.

No. 14, the Bristol "Bullet," 450 h.p. Bristol "Jupiter" Engine

This is the machine exhibited at the Paris Aero Show of last year, when it was described in this journal. In spite of being a single-seater it is a fairly large machine, a fact which was apparently not realised by some of the "bookies," who judged it on engine power only. Its average speed round the Derby course worked out at about 132 m.p.h., but actually the speed is very much greater. The machine is chiefly remarkable on account of its wing construction. Each wing

spar is in duplicate, providing great strength, and it is claimed for it that it can be stunted at full speed without fear of the wings breaking. The fuselage is a girder structure of rectangular section, streamlined with formers and stringers covered with fabric.

No. 15, the Martinsyde "Semi-Quaver," 300 h.p. Hispano-Suiza Engine

As this machine was exhibited at the recent Olympia Aero Show, it will still be remembered by those of our readers who made a visit to the Martinsyde stand. Although much smaller than the other Martinsyde machines, it has a strong family resemblance to them, and is certainly quite as pretty as anything which has left Mr. Handasyde's drawing board. Its wing bracing is unusual in that there is no centre section, the top plane, which is in one piece (or rather was before the race), being attached direct to a faired fin growing out of the top of the fuselage. Incidentally this fin may have been the means of saving Mr. Courtney's life, for, in spite of the crash, the fin was undamaged, whereas the ordinary top plane centre section, mounted on struts, would almost certainly have given way. Another feature which was brought out by the crash was the enormous strength of the wings. The machine, just before turning over, literally bounced about on the wing tips, thus letting the machine down considerably more gently than if they had crumpled up instantly. Also one noticed that the rudder post was intact, which fact provided sufficient clearance between the coaming around the cockpit and ground, as the machine lay upside down, to protect the pilot's head. The "Semi-Quaver" is shown in the accompanying photograph and scale drawing, which will give an excellent idea of her general arrangement.

No. 16, the Nieuport "Goshawk," 320 h.p. A.B.C. "Dragonfly" Engine

This is the machine on which Mr. Tait-Cox recently established a British speed record at Martlesham by flying at a speed of 166.5 m.p.h. Generally speaking, it is similar to the "Nighthawk" as regards fuselage, tail, etc., but a very small pair of wings give it a considerably greater speed than the older machine. There is only one strut on each side, this being of the type known as an "I" strut. This means a considerable saving in wing bracing resistance, and is in no small measure responsible for the high speed attained. Unfortunately the machine did not finish the course, owing to engine trouble, and so one was unable to judge of the relative speed of it and the Martinsyde "Semi-Quaver." The latter has been modified somewhat since the Martlesham test, and may therefore be presumed to be practically as fast as the Nieuport. Had the engine of the latter stood up to its work as well as did the Hispano-Suiza there should have been a very exciting race between these two machines for first place in the Derby. Any difference in speed would have been small, and it would chiefly have been a test of piloting.

FRENCH MEMORIAL TO WILBUR WRIGHT

THE statue to Wilbur Wright, which has been erected at Le Mans, where the aviator carried out his first flights in France, was unveiled on July 18. The marble memorial, which was made possible through the generosity of Commodore Beaumont of the Aero Club of America, is the work of the sculptor Landowski. It is surmounted by the nude figure of a man represented as having scaled a rugged mountain peak and is stretching out his arms to the hitherto unconquered element, air. The base of the monument is carved with bas-relief figures of Wilbur and Orville Wright and Léon Bollée, the Frenchman who assisted Wilbur Wright to carry on his work at Le Mans. There are also two panels, one showing Dædalus fixing the wings to the shoulders of Icarus, and the other depicting him carrying the dead body of his

son. Above the first the names of the pioneers are inscribed, while over the other appear the names of the first thirty pilots who met their deaths. Among the large gathering present at the unveiling were Genl. Dumesnil, Secretary of Military Aeronautics, representing the Government; Mr. Myron T. Herrick, former American Ambassador at Paris; Admiral Magruder, representing the present Ambassador (Mr. Hugh C. Wallace); Comte Henri de la Vaulx, president of the Aero Club; M. d'Estournelles de Constant, president of the Monument Committee, and many others.

After the ceremony M. d'Estournelles de Constant pinned the Cross of the Légion of Honour on the breast of Commodore Beaumont, and announced that he had presented a sum of 100,000 francs to the relief fund of the Aero Club of France.

A Fast Trip to Brussels

WORD comes from Brussels that Capt. Halliwell on July 24 did the trip from London to Brussels in 1 hr. 36 mins., his time for the Channel crossing from Folkestone to Grisnez being less than 9 mins.

Continental Service Extensions

PROPOSALS are being considered to extend the Strasbourg-Zurich aeroplane service to Antwerp, while the Compagnie Transaériennes de l'Est are going to start services of a similar kind between Paris and Frankfurt.

A Copenhagen-London Service

It is hoped that the Danish Air Traffic Company will commence a service between London and Copenhagen via Amsterdam and Rotterdam, on August 1. Twelve aeroplanes are said to be ready, and another four, similar to machines in use on the London to Paris route, are being purchased. It is expected that the fare from Copenhagen to London will be between £40 and £50 per passenger. Another service from Copenhagen to Warnemünde and Berlin will commence about the same time.



In the second volume of General Ludendorff's work upon the War, "Documents of the General Staff," just published, the fact is definitely nailed down by documentary evidence that the most persistent advocate of air-bombing London, from a mistaken psychological view of Britons, was Hindenburg. In July, 1917, Hindenburg was still hammering away, apparently, in correspondence with Von Bethmann-Hollweg, insisting that air attacks upon London would force the British to make peace instead of filling them with greater determination than ever to beat Germany.

SINCE the recently noted air funeral in America, some enterprising undertaker has, it is reported, constructed an aerial "hearse." This is to be formally "launched" at the Undertakers' Convention next month. In keeping with this innovation, a passenger Mourning plane, with accommodation for fifteen persons, is also being built as a part of the funeral equipment.

A "STRANGE story" indeed, as "Londoner" in the *Evening Standard* remarks, is the following:—

"An extraordinary story reaches me to-day of mysterious aeroplanes in the West of Ireland, manned by Sinn Feiners wearing British uniforms, which have visited certain British camps there and, so my story goes, have dropped bombs on our troops.

The aeroplanes, it is believed, are ex-Army machines which have been sold through the Disposals Board, and it is known that several 'planes have been flown from England

to Ireland. The Government have now placed an embargo on all sales of aeroplanes to Ireland, and certain steps are being taken to endeavour to trace the Irish aerial bandits.

On the eve of the Aerial Derby it is worth noting that the "betting" at the Royal Aero Club panned out as follows:— 11-2 Hawker; 15-2 Hinkler; 8-1 each Tait, Cox and Raynham; 100-6 each Heslam, Hamersley, Uwins, James and Nisbet; 20-1 each Jordan, Longton, Fall, Cotton, and Hubbard; 25-1 Jensen.

No doubt these were the figures over which the few skipping bookies came to grief. It is good to learn that steps were as far as possible taken to minimise the risk of such happenings and it is to be hoped that, in justice to the properly accredited bookmakers, the welshing culprits may be brought to book in every sense of the word. It was indeed smart of the Aero Club authorities to take the precaution of having the price merchants photographed *in situ*, as this should be very helpful to Scotland Yard in securing convictions. Although of not too savoury a nature, it must be noted that this little episode is yet another "Milestone" in relation to affairs aeronautical. For future occasions would it not be possible for the Royal Aero Club to "license" each bookmaker to ply his avocation, the license carrying with it some distinct and conspicuous emblem to be displayed by such licensee. Any person in the enclosures or anywhere within the jurisdiction of those in authority, who tried to do business without this authorised emblem could and should be immediately ejected, due notice having, of course, been given under properly displayed regulations governing all admission to the premises, of the right reserved by the Management to so treat any transgressors of this rule. The reputable "bookies" would be the first to applaud such a procedure.

A GOOD deal of fuss has been made recently about the continued existence of a range of anti-aircraft guns at North Dulwich, together with the contingent necessary to look after them. Apparently, by reasons of the light shed upon the subject, or by mere coincidence, instructions have since been given to have these guns and the *personnel* removed. We have no knowledge as to this particular unit and its usefulness, but for goodness sake don't let unreasonable publicity to so-called "scandals" in this direction jeopardise the permanent keeping together of anti-aircraft organisation sufficient to ensure our readiness for rapid expansion, should necessity for it, at some future date, unfortunately arise. It is a wise precaution to see that provision is made for a nucleus of aircraft defence to be preserved. Things may happen suddenly through the Air, and just think of the possibilities which may be in store for us all from the possible expansion of that "strange story" of Irish aeroplanes already referred to in these notes!

IN a new series of postage stamps issued by Brazil, one of the designers shows Aviation, personified by a female figure, together with an aeroplane rising in the dawn. This design is allocated to the 100 reis, red, and 200 reis, blue values.

WHEN will that British aerial postage stamp materialise?

AVIATION appears, not perhaps unnaturally, to raise curious problems in life. One of the quaintest of recent date is set out in a letter to Messrs. Handley Page and Co., Ltd., from Mr. Hubert Dean, whose mildly voiced protest under date July 23 is as follows:—

"I beg to call your attention to the fact that your pilots flying low over my house at 12, Gillingham Road, Cricklewood, are causing damage to my furniture by the pressure of air from the propellers blowing soot, etc., down the chimney.

"I do not write in any antagonistic spirit, but think if the fact is mentioned, you will no doubt put the matter right."

AFTER mature reflection, it occurs to one that the obvious remedy is to see that one's chimneys are kept thoroughly



"Flight" Copyright

Professor Newall fills an interlude during the Aerial Derby by making a "double" parachute descent

swept. Just think of the catastrophe from a foul chimney conflagration which may have been avoided by these same planes doing the sweeping gratuitously, although it is true "on the reverse." Wonder if this discovery may ultimately even resolve itself into a valuable "by-product" for Aviation Companies?

"Chimney sweeping with efficiency and regularity by our special down-draught methods" may yet form an attractive side-line for struggling aeroplane constructors what time they are trying to get their affairs on to a stable basis.

GENERAL W. S. BRANCKER, in a letter to the press, gives us the benefit of his valuable experience in connection with commercial air services being developed through our French friends. General Brancker writes as follows:—

"I have just had the opportunity of travelling by the French Commercial Air Service which is operating between Casablanca in French Morocco and Toulouse in France; some information concerning it may be of interest to your readers.

"The service runs twice a week: Tuesdays and Saturdays from Toulouse, and Tuesdays and Fridays from Casablanca. The route is divided into four stages by stations at Malaga, Alicante, and Barcelona; at each of these stations pilots and aeroplanes are changed.

"The aeroplane leaves Casablanca at an early hour in the morning, halts at Rabat to pick up the Government mails, and arrives at Malaga in time for *déjeuner*. Starting again about mid-day, and flying *via* Granada and Murcia, Alicante is reached between 3 and 3.30 p.m. The aerodrome is close to the town, where there is a good hotel, and here one stays the night. The next morning Barcelona is reached in time for *déjeuner*, and Toulouse between 3 and 3.30, which gives ample time to catch the 7.40 p.m. train from Toulouse, arriving in Paris at 9.30 a.m. the morning after.

"A similar time-table is followed in the opposite direction. Thus today Casablanca is within 48 hours of Paris. Next year the company operating this service promises to extend its line to Dakka, in Senegal, and to so increase the number of stages flown in the day that Paris will actually be only 24 hours from Casablanca. The prices are not exorbitant; I think the fare from Casablanca to Toulouse is 1,600 francs, and personally I paid a little over 1,000 francs from Malaga to Toulouse. Ten kilos. of personal luggage is carried free, but considerably more is taken at a small extra charge. In my own case, the aeroplane was not full, and I took about 60 lbs. free of charge. The charge for letters is made according to weight, starting with 1½ francs. for 20 grammes.

"The British inhabitants of Rabat are already using this rapid means of communication with England, but unfortunately our own Post Office has not yet made arrangements whereby letters from England can be sent to Morocco by this service."

BRINGING the picture into the personal focus, General Brancker continues:—

"Personally, I had a most comfortable journey; the pilots were perfect, the engines ran faultlessly, and the scenery was glorious; and I arrived at Toulouse more firmly convinced than ever that every one who can afford it will travel by air in the future. Everything I saw impressed me with the efficiency and thoroughness of the organisation.

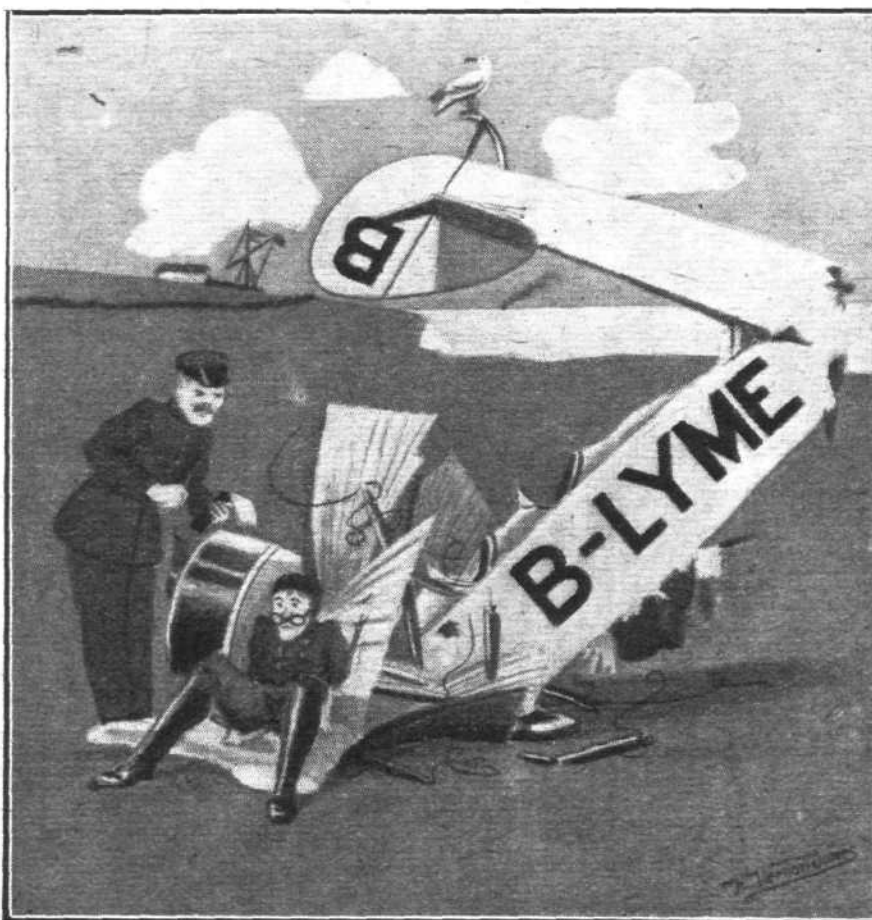
"It must be remembered that the operation of this service is only rendered financially possible at present by the liberal subsidies granted it by the French and Moroccan

Governments. The management, however, is most optimistic regarding the future, when the initial difficulties and teething troubles have been overcome by means of this assistance; as I mentioned above, an extension to Dakka and a great acceleration in the time-table have been decided on, and a new machine specially designed for carrying passengers by night is almost completed.

"Meanwhile I wonder if our own Post Office has contemplated the possibility of employing this service for the carriage of letters between Gibraltar and England. It would be necessary to break down certain international and military prejudices before French aeroplanes could land near Gibraltar, but a letter posted at 9 a.m. on Tuesday in Gibraltar could be delivered in London on Thursday afternoon by using the night train from Toulouse to Paris and the Paris to London air mail service. Next year, if present plans take form, this time could be considerably lessened.

"It may be urged that a British service should be organised to carry the Gibraltar and other British mails, but it must be remembered that no British service could compete with a French service under present conditions."

[M-TT—or is it J-ff?—as a great flyer, has decided to give up his air job. He has confided to J-ff—or J-ff has confided to him—that doubt has arisen in his mind, when away up at his ceiling, as to what would happen to him if, when up there, our little hemisphere were suddenly to disappear into the *ewigkeit*. Where to goodness would he find a place to land! It is to be hoped the rest of our great pilots will not get cold feet from the same cause. (N.B.—We are taking chances of having infringed any copyright in hinting at the original names of the great M-tt and J-ff. It should be expressly noted, we are not *Fishers* out this way, as *Budding* journalists, for notoriety.—ED.)



"CIVIL AVIATION"

CUSTOMS OFFICER: "Anything to declare, Sir?"

A French Lady's High Flight

ALTHOUGH the Aero Club of France does not recognise women's records, as such, Mdlle. A. Boland on July 17, during a flight of 2½ hours on her Caudron G3, succeeded in reaching an altitude of 4,800 metres. It is understood that the flight was observed by the Commissioner of the Aero Club of France.

Back to Denmark

THE two Danish naval aeroplanes which recently came

across the North Sea to Felixstowe returned on July 25. They left Felixstowe at 7 a.m. and reached Copenhagen at 5.15 p.m. after successfully negotiating a heavy gale.

By Aeroplane to Portugal

It is reported that there is just a possibility of an aerial mail service being established between Great Britain and Portugal. The matter is still under the consideration of the Anglo-Portuguese Chamber of Commerce, but up to the present nothing definite has transpired.

NAVAL ARCHITECTURE IN AERONAUTICS

By JEROME C. HUNSAKER, Eng.D., Commander, Construction Corps, U.S. Navy

(Continued from page 695)

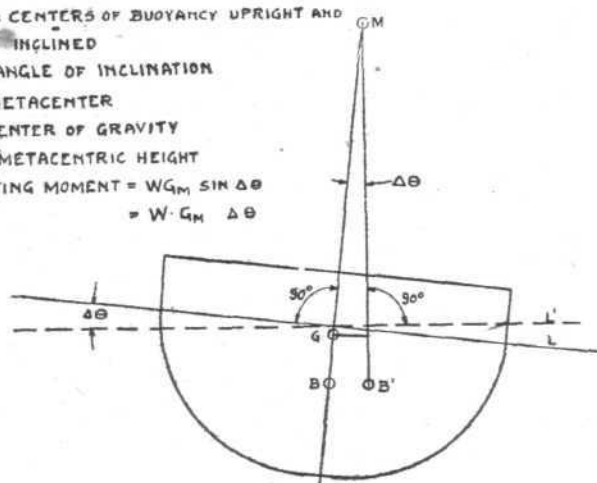
Abstract of Appendix II

Metacentric Height.—They that go down to the sea in ships are wont to criticise a ship in an off-hand manner, her wetness or dryness, her period of roll, whether she will sail sweetly or prove crank, and other mysterious details of her intimate behaviour among waves. And all this with an apparent confidence which to a layman must betoken a wisdom such as Solomon's. But there really is little mystery about it, for, nearly 175 years ago, Bouguer, the father of theoretical naval architecture, hit upon the brilliant conception of a metacentric height to serve as a measure of stability. Since that time thousands of ships have gone to sea with cargoes stowed in an indefinite number of arrangements, and millions of passengers, as well as animals, have

waves are even more elusive than the theory of aeroplane stability so beautifully developed by Bryan* and Bairstow.† And just as the naval architect proceeds to design good vessels by using his practical judgment based on experience and a knowledge of the metacentric height regardless of the mathematics of resisted and synchronous rolling, so do we find aeroplane designers producing good aeroplanes, using practical judgment and very little mathematics. I have yet to find anyone in a successful aeroplane design office solving simultaneous differential equations of motion.

Unfortunately, the aeroplane designer has not 100 years of experience to draw on, and there has been no ready handle on an aeroplane to seize upon like a metacentric height. Consequently, a great deal must be left to judgment, artistic

W = TOTAL WEIGHT.
 L, L' = WATER LINES UPRIGHT AND INCLINED.
 B, B' = CENTERS OF BUOYANCY UPRIGHT AND INCLINED.
 $\Delta \theta$ = ANGLE OF INCLINATION
 M = METACENTER
 G = CENTER OF GRAVITY
 G_M = METACENTRIC HEIGHT
RIGHTING MOMENT = $W G_M \sin \Delta \theta$
= $W \cdot G_M \cdot \Delta \theta$



been made violently or only mildly ill. Some ships carried sail well, others were crank; some ships proved stiff but violent in motion, others capsized. Every sort of marine disaster has occurred, and as a result an enormous store of experience has been accumulated. In nearly all such cases a knowledge of the metacentric height of the vessel has proved to be a valuable index to her behaviour.

The metacentric height or distance from the centre of gravity to the metacenter is the limit of the distance G_m on Fig. 1 as the angle of roll $\Delta \theta$ from the normal or upright position becomes small.

A ship is stable if there is a righting moment for any angle of heel. The initial stability is measured by the metacentric height in the upright position. If the ship be already heeled through a large angle, she is still stable if she still has a positive metacentric height. There is thus to be considered the problem of range of stability or the angle of heel permissible before the metacentric height vanishes.

The period of a roll, neglecting damping, is given by the expression:—

$$t = \pi k / \sqrt{g \cdot G_m}, \text{ where } k \text{ is radius of gyration.}$$

It appears that the rolling will be quick and hence uncomfortable when G_m is large. For an easy ship G_m should be small, but not so small as to impair the range of stability. For passenger steamers G_m may be made small with safety, but for warships it is necessary to provide a larger G_m than the gunnery officers would desire, to provide for stability in a damaged condition. Battleships sunk in action usually capsize before going under.

I have spoken so far of the "lateral" metacenter which controls the rolling of vessels. There is, of course, a strictly analogous "longitudinal" metacenter which controls the pitching.

The metacentric height is, of course, an index to the statical condition only, but for all practical purposes has served the naval architect very well. The dynamics of rolling among

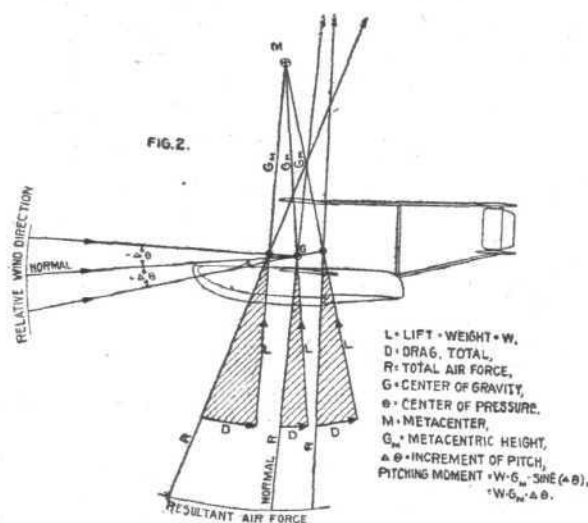


DIAGRAM ILLUSTRATING PHYSICAL MEANING OF METACENTER

feeling, comparison with other aeroplanes, and eventually to the opinion or prejudice of the test pilot.

The need for some ready means for off-hand judgment of aeroplane stability and manoeuvrability has been felt for a long time. The mathematics of stability are too cumbersome for practical use, and require extensive wind tunnel research to establish the necessary constants. It is my

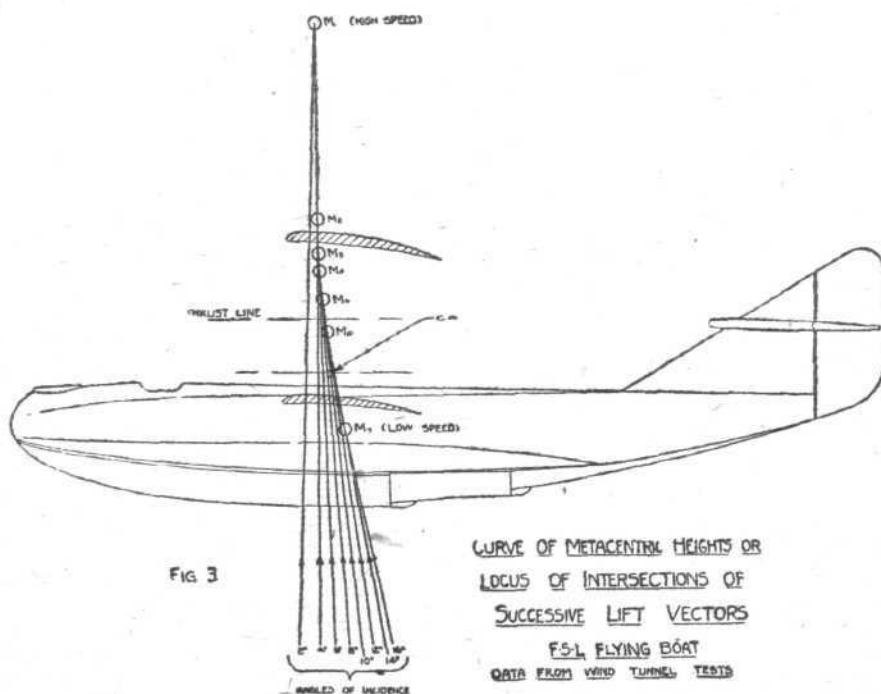


FIG 3

CURVE OF METACENTRIC HEIGHTS OR
LOCUS OF INTERSECTIONS OF
SUCCESSIVE LIFT VECTORS
F-1, FLYING BOAT
DATA FROM WIND TUNNEL TESTS

experience that we can build and fly a small aeroplane in less time than it takes to perform the stability calculations.

The general case of the disturbed motion of an aeroplane is not simple, but the longitudinal or symmetrical motion is

* G. H. Bryan, "Stability in Aviation," Macmillan, London, 1911.

† L. Bairstow, "Advisory Committee for Aeronautics," R. and M., 116-122, London, 1914.

two-dimensional, and can be considered apart from the lateral or asymmetric motion. For the longitudinal motion, we are interested in the pitching oscillations and the criterion that such oscillations be stable. For aeroplanes of normal

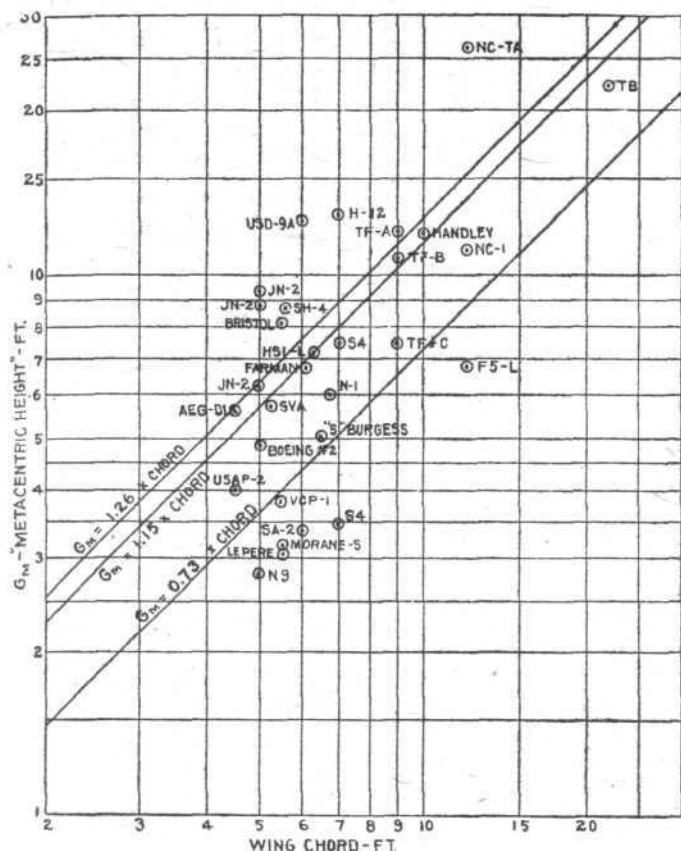


FIG. 4. METACENTRIC HEIGHT AT NORMAL FLYING ATTITUDE

design, if there be a righting moment called into play by any angular deviation from the normal attitude,* the pitching oscillations so produced are strongly damped. In other words, if an aeroplane be statically stable, it is also dynamically stable, so far as pitching is concerned.†

My colleague, Commander Wm. McEntee (C.C.), U.S. Navy, suggested the application of the naval architect's metacentre to measure the static stiffness of an aeroplane's longitudinal stability. I have assembled the data from all of the wind tunnel tests on complete model aeroplanes that I had available, and have computed the metacentric height

M_w of Bairstow's notation, but immensely more easy to remember for use for purposes of comparison. It is also proportional to the centre of pressure motion. To give the length Gm a physical meaning, Fig. 2 has been drawn to an exaggerated scale. It will be noted that m is the intersection of resultant lift vectors for successive angles of incidence,

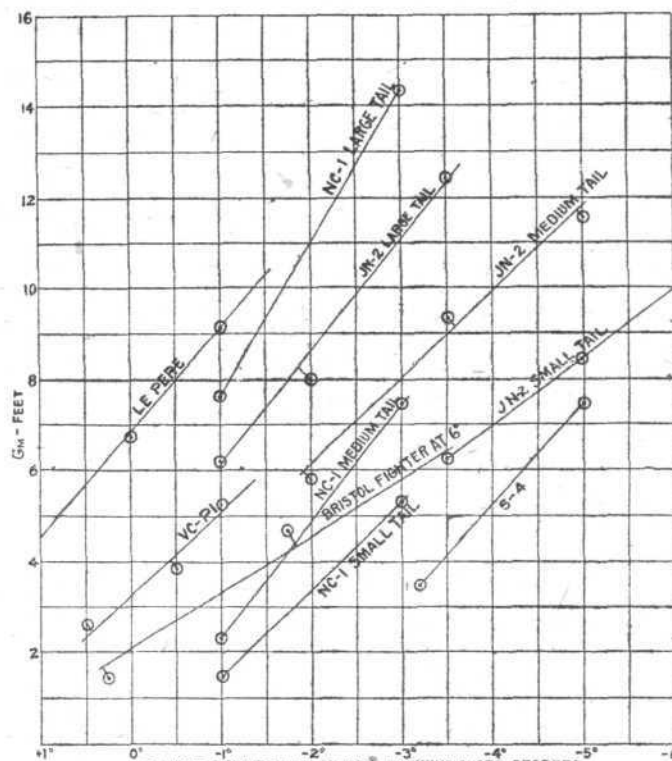


FIG. 5. METACENTRIC HEIGHT EFFECT OF CHANGE IN ANGLE OF STABILIZER SETTING

resolving the lift component at a line of reference through the centre of gravity in the direction of motion. As an intersection, m is, therefore, dependent on the angle of incidence, and it can be shown that for large angles of incidence m approaches G . The metacentric height grows less and tends to vanish when the aeroplane stalls. This is, of course, entirely consistent with the unfortunate natural phenomenon which makes a stalled aeroplane notoriously unstable.

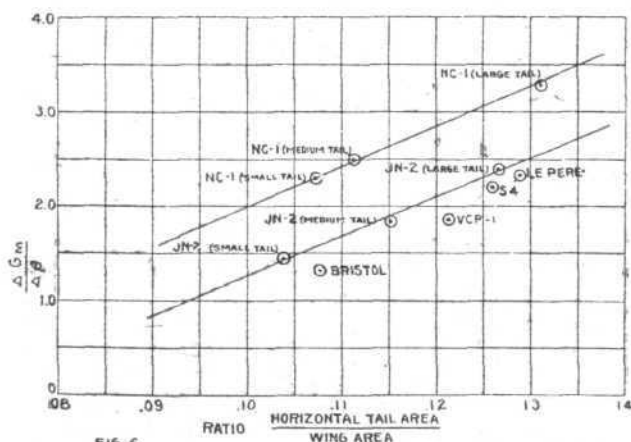


FIG. 6. METACENTRIC HEIGHT DEPENDENCE OF THE EFFECT OF CHANGE IN ANGLE OF STABILIZER SETTING UPON THE AREA OF HORIZONTAL TAIL SURFACES

from the observed slope of the curve of pitching moments in the following manner:—

$$\Delta M / \Delta \theta = \text{slope of curve of pitching moment.}$$

$$\text{And } M = W Gm \sin \theta = W Gm \theta, \text{ for small angles,}$$

$$\text{But } M = (\Delta M / \Delta \theta) \theta.$$

$$\text{Then } Gm = (1/W) (\Delta M / \Delta \theta).$$

This algebraic definition of Gm has the dimensions of a length and amounts to from 2 to 12 ft. for modern aeroplanes and flying boats. It is directly proportional to the coefficient

* A positive value of M_w in Bairstow's notation.

† Hunsaker, "Dynamical Stability of Aeroplanes," Smithsonian Misc. Coll., Vol. LXII, No. 5.

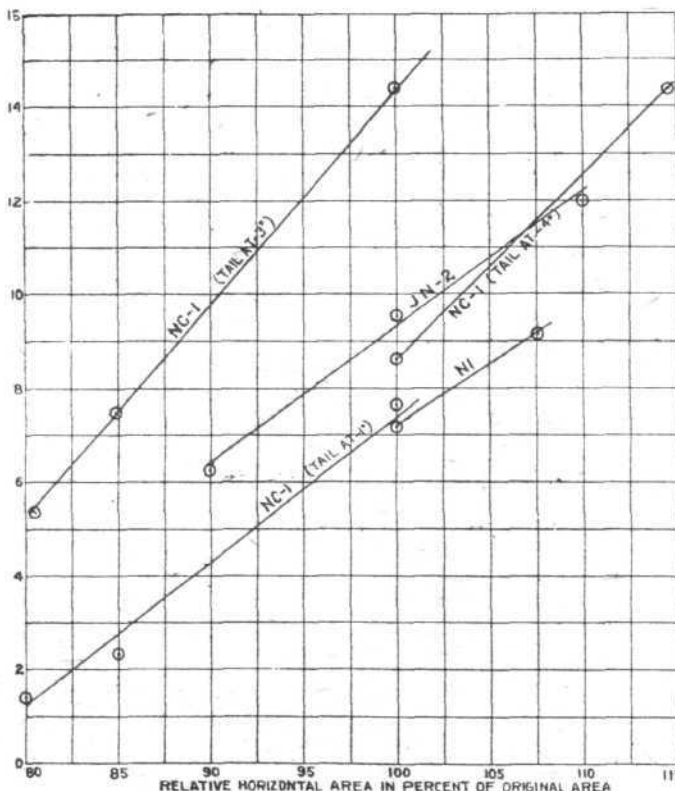


FIG. 7. METACENTRIC HEIGHT EFFECT OF CHANGE IN AREA OF HORIZONTAL TAIL SURFACE

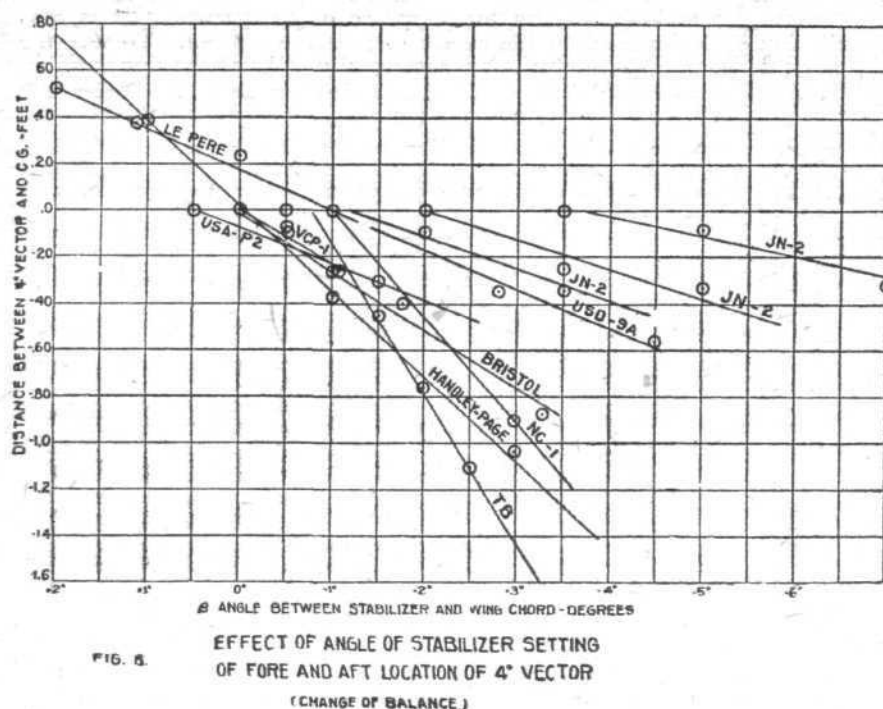


Fig. 3 is a graphical representation of a wind tunnel test of a model of a flying boat. It shows how G_m diminishes for larger angles of incidence until it vanishes at about 12° .

Table I, of Appendix II, gives the metacentric heights calculated from wind tunnel tests on complete models (ex propellers) of 27 types. Aeroplanes both small and large are included, as well as float seaplanes and flying boats. We have a truly miscellaneous collection, with British, French, German and American examples, which should give a good test of the naval architect's method of classification by means of metacentric height.

Designers have, in general, been giving a greater metacentric height for great chord length, which appears reasonable. Plotting the metacentric height against chord length on Fig. 4 brings this out clearly. The points group themselves about a straight line.

It therefore seems possible from a knowledge of the relation of chord to metacentric height for any design to say with some confidence whether the machine will be more or less stable (stiff) longitudinally than the average, and whether such stability will be reasonable or abnormal.

Effect of Change in Angle of Stabiliser Setting.—In Table II of Appendix II are assembled calculations of G_m from wind tunnel tests in which the setting of the stabiliser has been altered. To bring out the effect of such changes, Fig. 5 has been made where G_m is plotted against the angle of stabiliser setting, i.e., the angle between the stabiliser and the wing chord. It will be noted that the points fall near straight lines whose slopes are the change in G_m per degree change in angle of stabiliser setting. This slope is denoted by $\Delta G_m / \Delta \beta$ and is plotted against the ratio of horizontal tail area to wing area in Fig. 6.

It is found that $\Delta G_m / \Delta \beta$ depends on the area of the horizontal tail surfaces in a straight line function. The slope of each line of Fig. 5 when plotted on Fig. 6 falls near either one or the other of two straight lines which have substantially the same slope.

It is to be noted from these lines that the tractor type tail surface is less efficient than the N.C., a pusher type tail surface, a conclusion consistent with previous experimental work. (A. C. A. R. and M. 438 and 505.)

Effect of Change in Stabiliser Area.—The values of G_m for changes in stabiliser area are given for various machines in Table III of Appendix II. These values when plotted against

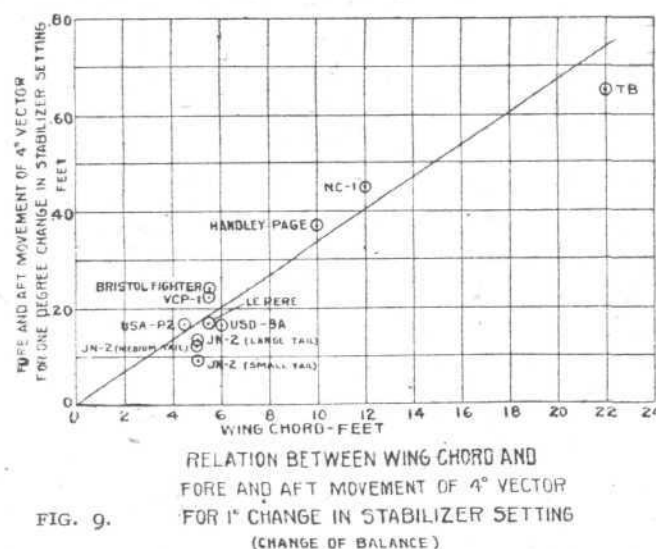
percentage of the original area (see Fig. 7) lie near straight lines. The variation in the slopes of these lines is small and seems to be independent of the original size of the stabiliser.

Fore and Aft Movement of Centre of Pressure.—In order to study the movement of the centre of pressure, the 4° vector location, or line of action of total air force for an angle of incidence of 4° , has been determined for a number of machines and for various stabiliser settings. These locations, which may be found in Table IV of Appendix II, are plotted on Fig. 8. For each machine the points are found to lie near a straight line, the line for the larger machines having, however, a greater slope than those for the smaller machines.

In Fig. 9 the slopes from the lines of Fig. 8 are plotted against the wing chord of the machines which they represent. The fact that all of the points so plotted lie very nearly on a straight line indicates that the movement of the 4° vector with change in angle of stabiliser setting is almost entirely dependent upon the wing chord. The average value of the movement of the 4° vector per degree change in stabiliser setting is found to be $0.033 \times \text{chord}$.

This movement is forward if the normally negative angle between stabiliser and wing chord is increased, and vice versa.

In the foregoing discussion I have tried to bring out the fact that an aeroplane actually has a metacentric height which is entirely under the control of the designer. It would very much clarify our knowledge of aeroplanes if we knew the initial metacentric height the designer gave it. Knowing



this, we could judge with some degree of confidence whether the machine is reasonably stable for its type. Further, if we knew the metacentric height as designed, the effect of stabiliser adjustment could be considered more intelligently than it is at present.

The adjustable stabiliser is a very useful and convenient device for altering the balance of a machine, but it also alters the metacentric height. It is quite possible, by excessive use of this means to balance up an otherwise tail heavy machine, entirely to destroy the metacentric height and hence the stability. The tables and charts I have given here may prove useful, I trust, in the consideration of such a possibility for a particular design. (To be Continued)

An Aircraft Disposal Souvenir

A UNIQUE publication is to hand in the shape of a booklet—if it is permissible so to call a thing measuring 20 ins. by 12 ins.—entitled "The Wings of Commerce." It has been got out as a souvenir of the great deal by which the Aircraft Disposal Company recently acquired the huge accumulation of Government aircraft and material and for which the Handley Page Co. are the sole selling agents. Photographs are given of the various types of machines available, and the specifications are in English, French and Spanish. Some fine designs by Garth Jones decorate the opening pages, which

also contain extracts from the speeches of Lord Londonderry and Mr. Handley Page at the luncheon held to celebrate the deal. The edition of the souvenir is limited to 2,000 copies and each one is signed by Mr. Handley Page.

An Aviation Company in Burma

THE interest taken by the Burmese in the possibilities of commercial aviation has resulted in the first aviation company being registered at Rangoon with a nominal capital of one million rupees. The objects of the Company are to acquire aircraft, carry on passenger services and commercial transport of every description.

THE ROYAL AIR FORCE

London Gazette, July 13

Flying Branch

Sqdn. Ldr. K. R. van der Spuy, M.C., relinquishes actg. rank of Wing Comdr. on ceasing to be employed as Wing Comdr.; May 21.

Sec. Lieuts. to be Lieuts.—(Hon. Lieut.) G. H. P. Whitfield, M.C.; July 7, 1918 (since reclassified Admin.) (since relinquished commn.) (substituted for *Gazette*, March 2). (Hon. Capt.) S. C. Savill; Aug. 31, 1918 (since relinquished commn.). D. Morford; May 28, 1919 (since demobilised). T. L. Gann; June 9 (since demobilised).

Pilot Officers to be Flight Officers.—H. H. Smith; Sept. 18, 1919 (since demobilised). G. Holden; Sept. 24, 1919 (since relinquished commn.). A. A. Barnes, R. H. Foxlee (since demobilised); Oct. 1, 1919. W. E. Dance; March 1 (since demobilised). E. W. Jordan; March 20 (since demobilised). (Then follow the names of 11 officers who are transfd. to the Unemployed List under various dates.)

Sqdn. Ldr. E. H. M. O'Farrell (R. Ir. Fus.), having retired from the Army and relinquished his R.A.F. commn., retains the rank of Lieut.-Col. Sec. Lieut. J. V. Norwood relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; May 29.

The notification in *Gazette*, June 29, concerning Sec. Lieut. W. W. Bradford is cancelled.

The notification in *Gazette*, April 23, concerning Sec. Lieut. A. Wilson is cancelled.

Administrative Branch

Flight Lieut. O. V. Thomas, O.B.E., to be Flight Lieut., from (T.), Sept. 20, 1919, and is graded for purposes of pay and allowances as Sqdn. Ldr. whilst employed as Sqdn. Ldr.; Sept. 20, 1919.

Sec. Lieuts. to be Lieuts.—(Hon. Capt.) W. W. W. Reilly; June 8, 1918 (since re-classified (T.)) (since relinquished commn.). R. Wight; Feb. 1, 1919 (since demobilised). P. Harvey; Feb. 13, 1919.

Pilot Officers to be Flying Officers.—T. H. Youens; Oct. 1, 1919 (since demobilised). E. F. de B. Greenwood; Nov. 3, 1919 (since demobilised). W. Shaw; March 2 (since demobilised).

Flight Lieut. E. Edwards (Paym. Lieut., R.N.) relinquishes his temp. R.A.F. commn. on return to the R.N.; Nov. 13, 1918.

(Then follow the names of 2 officers who are transfd. to the Unemployed List under various dates.)

Lieut. (Hon. Capt.) C. H. M. Willson (Liverpool Regt.) relinquishes his commn., and is permitted to retain the rank of Capt.; Feb. 25, 1919 (substituted for *Gazette*, Feb. 25, 1919). Sec. Lieut. R. P. Squire relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Dec. 21, 1919 (substituted for *Gazette*, March 4, 1919). The notification in *Gazette* (April 4, 1919) concerning Sec. Lieut. R. P. Squire is cancelled.

Technical Branch

Pilot Officer E. J. Williams to be Flying Officer, Grade (A); Oct. 1, 1919 (since demobilised).

Pilot Officers to be Flying Officers, Grade (B).—H. Harper (since demobilised), H. W. Mapley (since demobilised), S. F. Robbins (since demobilised); Oct. 1, 1919.

Pilot Officer W. N. Formby to be Flying Officer, without pay and allowances of that rank; Oct. 1, 1919 (since demobilised). Flight Lieut. (actg. Sqdn. Ldr.) A. Crook, O.B.E. (Qrmr. Maj., Gen. List), relinquishes his temp. R.A.F. commn. on return to Army duty; June 8 (substituted for *Gazette*, June 18).

(Then follow the names of 14 officers who are transfd. to the Unemployed List under various dates.)

Maj. F. A. C. Hole relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; July 11. Sec. Lieut. (Hon. Maj.) (actg. Capt.) H. P. Coles relinquishes his R.A.F. commn., and is granted the rank of Maj.; Feb. 2, 1919 (substituted for notification in *Gazette*, April 4, 1919).

Memorandum

(Then follow the names of 23 Cadets granted hon. commns. as Sec. Lieuts.) Sec. Lieut. F. K. Fanshawe relinquishes his hon. commn.; May 16.

London Gazette, July 16

Permanent Commissions

The notification in *Gazette* Nov. 7, 1919, appointing Flying Offr. E. D. G. Galley, M.C., A.F.C. (A), to a perm. commn., is cancelled.

Short Service Commissions

The notification in *Gazette* of July 13 concerning Flying Offr. R. B. Sutherland, D.F.C. (Can. Engrs.) is cancelled.

Flying Branch

Sec. Lieut. J. F. D. Tanqueray to be Lieut. (May 14, 1918) since relinquished his commn.).

(Then follow the names of 18 officers who are transfd. to the Unemployed List under various dates.)

Capt. M. G. F. Richardson relinquishes his commn., and is permitted to retain rank of Capt. (Feb. 10, 1919) (substituted for *Gazette* of April 1, 1919).

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—G. Holden (contracted on active service) (May 14) (substd. for notification in *Gazette* May 21); T. W. Calvert (caused by wounds) (July 8).

Sec. Lieut. S. B. Potter relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank (July 9).

The notification in *Gazette* June 29 concerning Sec. Lieut. F. F. Tattam is cancelled.

Administrative Branch

Flying Offr. (Hon. Flight Lieut.) H. A. Kelsall, M.C. (Capt. R.A.S.C.), relinquishes his temp. R.A.F. commn. on return to Army duty (July 9).

(Then follow the names of 5 officers who are transfd. to the Unemployed List under various dates.)

Lieut. H. R. Boasten relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank (May 29) (substd. for notification in *Gazette* June 8).

Technical Branch

(Then follow the names of 7 officers who are transfd. to the Unemployed List under various dates.)

The rank of Capt. G. S. Hallas is as now described, and not as stated in *Gazette* April 30.

Permanent Commissions

Flying Officer A. H. G. Dunkerley (A.) resigns his permanent commission, and is granted the rank of Flight-Lieut. (May 27) (substituted for notification in *Gazette* of June 22).

Flying Branch

Lieut. F. D. C. Gaiger to be Lieut. (O.) from (T.); May 5, 1919. Pilot Officer A. B. G. Gunn to be Flying Officer; Sept. 11, 1919 (since demobilised). (Then follow the names of 10 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank:—J. H. Ball (contracted on active service), H. Thomas (caused by wounds); July 14. Sec. Lieut. (Hon. Lieut.) A. J. Franklin relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain the rank of Lieut.; July 13. Sec. Lieut. E. E. Brown relinquishes his commn. on account of ill-health, and is permitted to retain his rank; May 20, 1919. The notification in *Gazette* of July 9 concerning Sec. Lieut. A. Ellis is cancelled.

Administrative Branch

Pilot Officer J. H. E. Weekes to be Flying Officer; May 11. Lieut. S. Wyatt is placed on the Rtd. List; July 21.

Two officers transferred to Unemployed List.

Sec. Lieut. (acting Lieut.) W. Spink relinquishes his temp. R.A.F. commn.; Feb. 19, 1919 (substituted for notification in *Gazette* of April 4, 1919). The notification in *Gazette* of Dec. 17, 1918, concerning Lieut. J. Duncan is cancelled.

Technical Branch

Flying Officer F. N. Trinder is graded for purposes of pay and allowances as Flight Lieut. whilst employed as Flight Lieut., Grade (A); May 15, 1919. Sec. Lieut. (Hon. Lieut.) E. F. Millar to be Lieut., Grade (B); April 2, 1918 (since demobilised). Sec. Lieut. E. W. Hooton-Smith to be Lieut. (Dec. 30, 1918), without pay and allowances, of that rank prior to May 1, 1919. Pilot Officer F. Woombell to be Flying Officer, Grade (A); Oct. 1, 1919 (since demobilised).

Pilot Officers to be Flying Officers.—B. T. Crook, R. B. Harnden; Oct. 1, 1919. E. H. Hughes; April 13 (since demobilised). Sec. Lieut. (Hon. Lieut.) W. Dow to be Lieut., without pay and allowances of that rank; Oct. 7, 1918 (since demobilised).

Pilot Officers to be Flying Officers, without pay and allowances of that rank: C. C. Gissing; Aug. 19, 1919 (since granted short service commn.). S. Graves, Sept. 3, 1919 (since demobilised). R. A. Bell (since demobilised). R. A. Hornsby (since demobilised). V. H. Lurie (since demobilised); Oct. 1, 1919. Sec. Lieut. E. P. Ryan (late Hon. Lieut. and Q.M.R., Lancs. Fus.) is granted hon. rank of Lieut.; Aug. 16, 1918.

(Then follow the names of 6 officers who are transfd. to the Unemployed List under various dates.)

Lieut.-Col. C. P. Rooke, D.S.O. (Midd'x R.) relinquishes his R.A.F. commn.; May 5 (substituted for notification in *Gazette* June 1).

The notifications in *Gazette* June 17, 1919, concerning Sec. Lieut. H. P. Leigh, and *Gazette* June 18, concerning Flying Officer G. K. Deakin are cancelled.

Memoranda

(Then follow the names of 9 Cadets granted hon. commns. as Sec.-Lieuts.) Sec. Lieut. S. M. Melliss relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; June 7.

London Gazette, July 23

Permanent Commissions

The notification in *Gazette* of Aug. 1, 1919, appointing Lieut. F. Everett (T.) to a permanent commn. is cancelled. The surnames of following officers are as now described, and not as in *Gazette* of Aug. 1, 1919:—Maj. J. K. Wells (T.), Lieut. G. H. Elliot (O.), Lieut. F. F. Garraway (A.). The name of Flight Lieut. J. A. Slater, M.C., D.F.C. (A.), is as now described, and not as in *Gazette* of Oct. 28, 1919.

Short Service Commissions

The following officers are granted short service commns. in ranks stated, with effect from dates indicated, retaining their seniority in substantive rank last held by them prior to grant of this commn., except where otherwise stated:—

Flight Lieuts.—W. F. Anderson, D.S.O., D.F.C. (A.); July 21. J. O. Groves (A.); July 14. G. R. Hill (Ad.); April 1 (for duration of present appt.).

Flying Officer (from Flight Lieut.).—N. H. Dimmock, A.F.C. (A.); July 19.

Flying Officers.—J. H. Hargroves (A.), M. Hyslop (A.); July 21. C. W. Bragg (A.), A. M. G. Cosgrave (A.), C. G. Ferrell (A.); July 19. F. J. Fogarty (A.), L. Hamilton, D.F.C. (A.), S. L. H. Potter (A.); July 14.

Observer Officer.—J. F. Titmas; July 14.

Flying Officers (from Pilot Officers), with Seniority of the Dates Indicated.—E. H. Alliot (A.); July 16. A. A. B. Chipper (A.); July 20. M. C. Dudding (A. and S.); July 15. J. C. Dunbar (A.); July 22. M. S. Hale (A.); July 19.

Flying Officer Dimmock will be placed at the head of the list of Flying and Observer Officers, and will retain seniority relative to officers who have been similarly gazetted to short service commns. in a rank lower than their previous substantive rank in accordance with his previous position on the gradation list.

The notifications in *Gazette* of Sept. 12, 1919, apptg. Flying Officer E. Parrett (T.), and *Gazette* of May 18 apptg. Flying Officer H. C. Hawkins (A.) to short service commns. are cancelled.

The name of Flying Officer R. E. M. Milne (A.) is as now described, and not as in the *Gazette* of May 18. The name of Flight Lieut. C. C. Treatt (Ad.) is as now described, and not as in the *Gazette* of July 2.

Flying Branch

Flight Lieut. R. R. Mansell, O.B.E., is placed on the Half-Pay List (Scale B); July 24. Sec. Lieut. I. L. R. Large to be Lieut.; April 7, 1919 (since demobilised) (substituted for notification in the *Gazette* of May 25). Flying Officer (Hon. Flight Lieut.) E. J. Strover (Capt., Ind. Army) relinquishes his temp. R.A.F. commn. on return to Ind. Army; Feb. 26. Flying Officer N. G. Pring (Lieut., R.F.A.) relinquishes his temp. R.A.F. commn. on return to Army duty; July 6.

(Then follow the names of 15 officers who are transfd. to the Unemployed List under various dates.)

Flight Lieut. A. M. Walstell, D.S.C., relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; July 10 (substituted for notification in *Gazette* of July 9). Lieut. A. W. MacKey relinquishes his commn., and is permitted to retain his rank; Oct. 10, 1919.

Lieut. H. J. Bath (Yorks. R., T.F.) relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; June 25. Sec. Lieut. T. Irtuganoff resigns his R.A.F. commn.; July 5.

The Christian names of Cadet George Alfred Evans are as now described, and not Gwynne Albert Evans, as stated in *Gazette*; Nov. 29, 1918.

The notification in *Gazette* (Sept. 24, 1918) concerning Cadet S. B. Perry is cancelled (notification of Aug. 20, 1918, to stand).

The surname of Cadet Stanley Brooks Perry is as now described, and not Stanley Brooks-Perry, as stated in *Gazette*; Aug. 20, 1918.

Administrative Branch

Sec. Lieut. A. A. Mackay to be Lieut. ; March 2, 1919 (since demobilised) (substituted for notification in *Gazette* of May 11).

Flying Officer C. F. Jex (Sec. Lieut., Suff. R.) relinquishes his temp. R.A.F. commn. on return to Army duty ; May 4, 1918).

(Then follow the names of two officers who are transfd. to the Unemployed List under various dates.)

Technical Branch.

(Then follow the names of nine officers who are transfd. to the Unemployed List under various dates.)

Lieut. R. D. Owen relinquishes his R.A.F. commn., and is permitted to retain his rank ; April 6, 1919 (substituted for notification in the *Gazette* of April 29, 1919).

The notification in the *Gazette* of Dec. 13, 1918, concerning Capt. S. Lees is cancelled.



IN PARLIAMENT

Polegate Airship Station

Mr. GWYNNE on July 22, asked the Secretary of State for Air the reason of the delay in releasing the huts at the Polegate airship station for sale ; and whether, in view of the fact that accommodation is urgently required in that district, all the existing houses having been occupied for a long time past and that the men employed by the War Office in the district are being billeted in the neighbourhood, which is aggravating the situation, he will take steps to see that these huts, which are deteriorating by being left empty, are released forthwith.

Mr. Churchill: The huts in question have now been released for sale by the Disposal Board. The party of officers and men employed at Polegate to pack airship stores will be withdrawn in about a fortnight's time, and the billets they are now occupying will then be vacated.

R.N.A.S. Promotions

Mr. R. YOUNG asked the Secretary of State for Air, seeing it is admitted by his Department that promotion lists issued by the Royal Naval Air Service were regarded as authoritative and were used in connection with the adjustment of the pay of the ratings concerned, whether promotion list No. 36 was dated February 1, 1918 ; and whether the ratings on that list were duly promoted from the authorised date or whether there was any delay in giving effect to the Order.

Mr. Churchill: I am informed that promotion list No. 36 was dated February 1, 1918. It was issued on July 2, 1918, and was no doubt acted on with the least possible delay, though I am unable to state after this lapse of time whether delay occurred in any particular case. Promotions took effect from February 1, 1918, with the consequential adjustment of pay. I may add that the list was accompanied by instructions making the promotion of riggers (L) conditional upon the existence of vacancies in the authorised establishment, and also prohibiting the promotion of any men on the list who had committed themselves since being recommended. If the hon. Member will supply me with particulars of the case he has in mind I will have inquiries made.

Recruits

Mr. ROBERT YOUNG, in the House of Commons on July 21, asked the Secretary of State for Air whether there is a regulation which lays it down that where a recruit has enlisted in the Royal Air Force to follow a certain trade, and he is found inefficient or there is no work at his particular trade, he can claim to be discharged ; whether this discharge, if claimed, is free or must be paid for ; and, if paid for, what is the cost.

Mr. Churchill: The answer to the first part of the question is in the negative. The second and third parts, therefore, do not arise.

Air Ministry (Civil Engineers)

Mr. PALMER asked the Secretary of State for Air whether civil engineers employed by the Air Ministry have their hours of service laid down by Order in Council ; whether such Order involves the liability to give service every day, if required, between the hours of 10 a.m. and 6 p.m. ; whether there are any restrictions as to other occupations outside those hours ; and whether such public servants are, when work permits, granted leave of absence within these hours from Government offices in order to carry on private business.

Mr. Churchill: Generally speaking, the answer to the first and second parts of the question would be in the affirmative, and to the third and fourth parts in the negative. If the hon. member will be good enough to let me have particulars of any case in which he hears that the rules are not being observed, I shall be happy to inquire into it.

A Normal Year

Mr. WINTRINGHAM asked the Chancellor of the Exchequer what number of men he assumed would be maintained for the Navy, Army and Air Force respectively when making the estimate of expenditure contained in Command Paper 779 of 1920.

Mr. Chamberlain: The number of men which can be maintained on the proposed estimates must depend on the economic and general conditions at the time, and on the expenditure required on other objects than personnel.



ROYAL AERONAUTICAL SOCIETY NOTICES



Election of Members.—The following have recently been elected to the Scottish Branch in the various grades as shown :—

Members.—Flying Officer L. W. Allen, M.C., R. T. Currie, G. R. Donald, Capt. T. H. French, D.F.C., R.A.F., Flying Officer F. F. Garraway, R.A.F., Wm. Henderson, C.B., H. A. McCreadie, James Montgomerie, Pilot Officer D. Morton, Col. J. Smith Park, M.V.O., T. E. Pullinger, R. M. Reeve, Wing Comdr.

R. P. Ross, D.S.O., A.F.C., J. B. Taylor, Col. W. G. Thomson, A. de Dorlodot.

Associate Members.—J. H. Alexander, M.B., C. M., Capt. C. R. Alston, Sir G. W. Baxter, Bt., D.L., F. M. J. Bell, B. G. Blampied, Lord Blythswood, M.V.O., H. H. Eiriksson, H. H. Haines, P. C. Kerr, D. Leslie, E. D. McLaren, C. J. R. Morgan, R. L. Robertson, H. Giles Walker, A. J. Younger.

Office.—Members are requested to note that the offices of the Society at 7, Albemarle Street, W.1., will be closed from July 30 to August 17.

Donations.—The Council desire gratefully to acknowledge the receipt of "The Graphical Treatment of Differential Equations" by the author, S. Brodetsky, Associate Fellow, and "Who's Who in Engineering," which have been placed in the Library.

Annual Reports.—The Council desire gratefully to acknowledge the gift of the following numbers of the early "Annual Reports" of the Society from an Associate Fellow: No. 1 (1866), No. 3 (1868), No. 4 (1869) and No. 5 (1870). These early Reports are in many cases now exceedingly rare. No. 1 is particularly so, as it contains F. H. Wenham's famous paper on "Aerial Locomotion," reprinted as the first volume of the "Aeronautical Classics," which is also now out of print.

The copy of this First Annual Report just received is the only unbound copy of Wenham's paper available for purchase. Any Members who may be in possession of copies of any numbers of the Annual Reports, and wishing to dispose of them, are asked to communicate with the Secretary. Nos. 12 and 18 and 19 (issued together in one volume) are particularly desired.

The Member who recently borrowed the third bound volume of the Reports (1880-1893) from the shelf in the Library is requested to return it, as it is exceedingly valuable and no other copy is available for reference purposes by other Members.

Machine Tool and Engineering Exhibition.—A letter has been received from the Machine Tool and Engineering Trades Association offering special facilities to Members of the Society during the Machine Tool and Engineering Exhibition to be held at Olympia from September 4 to September 25. Tickets of admission at half-price may be obtained from the Secretary. Members requiring these should make early application as only a limited number will be available and it is desired to inform the Machine Tool Trades Association as to the number desired, as soon as possible.

Library.—The London General Omnibus Company have most kindly acceded to a request for copies of confidential reports of their researches on Alcohol Fuel Compounds for Internal Combustion Engines. These are now therefore available for reference purposes by Members, who will no doubt appreciate the courtesy of the Company. It should be understood that these reports are supplied on the express understanding that they will be treated as "Private and Confidential" and will under no circumstances be published.

W. LOCKWOOD MARSH,

7, Albemarle Street.

Secretary

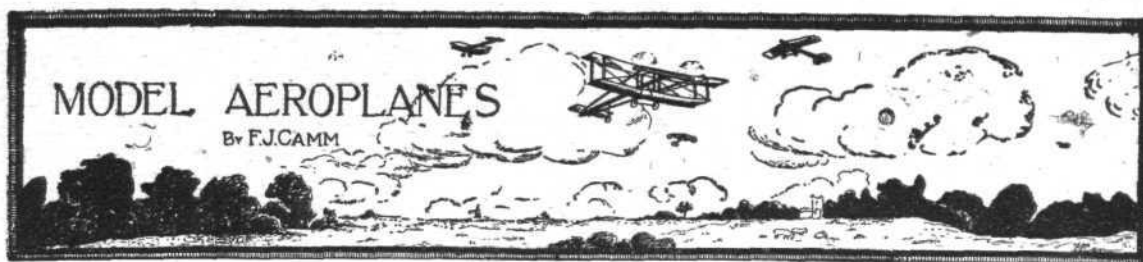


Commercial Aviation in Brazil

AFTER all that has been said about the possibilities and prospects of commercial aviation in Brazil, it is a little disconcerting to read in the report of Mr. E. Hanbloch, commercial secretary to H.M. Embassy, Rio de Janeiro, on the general economic and financial conditions of Brazil for the year 1919, that there is no real progress to be noted under this heading. He goes on to say that the Brazilian Army and Navy have various French, Italian and American

machines, and that the Aero Club Brasileiro has been formed, but so far no flying is done except in the Army and the Navy.

"British aircraft manufacturers have been considering the possibilities of commercial aviation, and have sent representatives and experts to Brazil. There seems every possibility of an aerial postal and passenger service being inaugurated very soon between Pernambuco and Buenos Aires, via Rio de Janeiro and other intermediate towns of importance."



All communications to be addressed to the Model Editor. A stamp should be enclosed for a postal reply

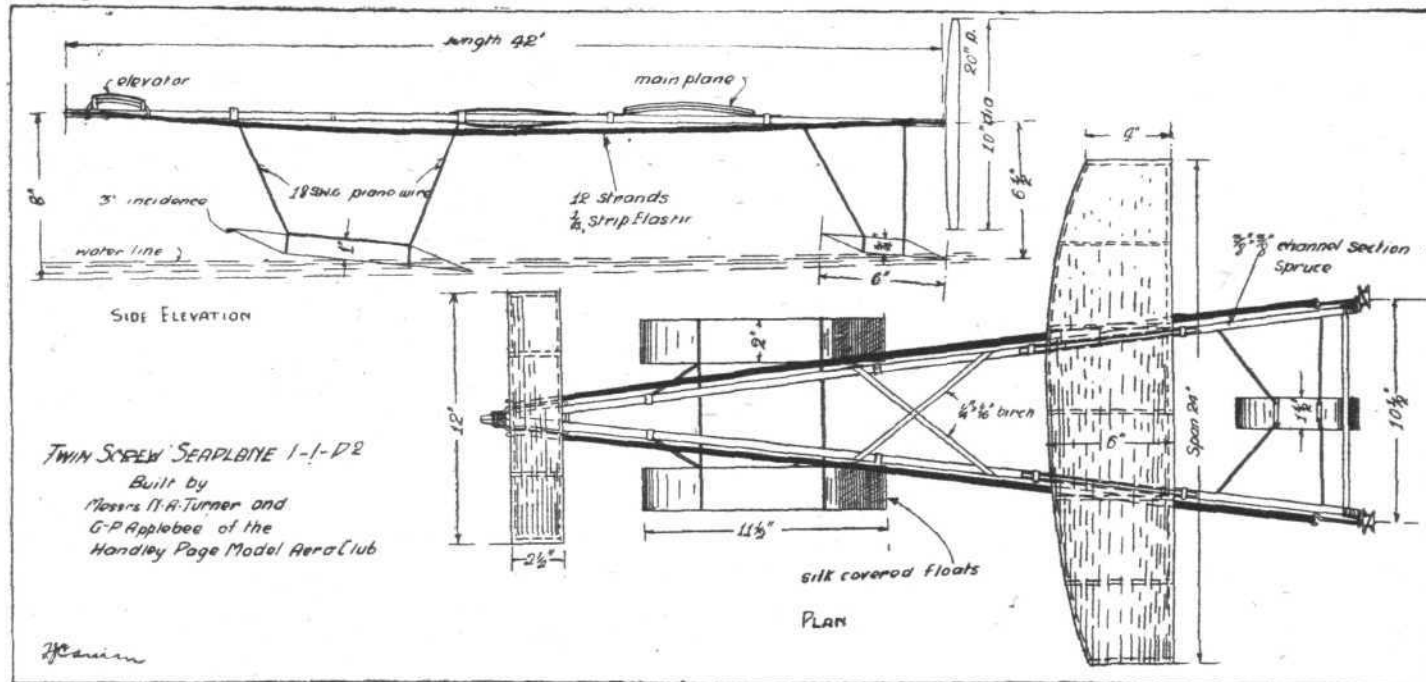
Some Olympia Models

DOUBTLESS many readers who visited the show were interested in the scale model tractor biplane (mechanical in every detail) which was exhibited in the Inventions and Models section of the Aero Show. It constituted a fine piece of scale model work, and evoked admiration from sources whose opinions are worth valuing. Mr. G. H. Robinson, the constructor and designer of it, has kindly furnished us with the following particulars of the machine in question: Scale, $1\frac{1}{2}$ in. to the ft.; main planes sparred, box, ribbed, covered and doped. The fuselage is built up to scale, with wire plan bracing inside, dual control with mechanical apparatus for working, ailerons, rudder elevators. The strut sockets and under-carriage vees and all cast brass for which patterns were all made by Mr. Robinson. The wires

receive further particulars of the machine as soon as results are obtainable.

The Kite and Model Aeroplane Association

SINCE writing my note in "FLIGHT" last week, relating to the K.M.A.A., there have been further developments relating to its revival. I am still in negotiation with Messrs. Houlberg and Lyche, and as soon as the time is ripe, I hope to issue a very full and complete statement concerning it. Meanwhile the following letter from Mr. McBirnie will be of interest:—"Observing from your letter in "FLIGHT" last week, I would like to say that I saw Mr. Lyche a few days ago, and he says, *re* the prizes, that Mr. Akehurst did not hand them over to him when he took over the Hon. Secretaryship, and he seems to know nothing definitely of Mr. Akehurst's movements.



(all of them) are adjustable by strainers (left and right-hand thread), and the propeller is worked by an electric motor. The Cowling and side doors are of highly polished copper (for finish only). The full size of the machine is as follows: Length of fuselage to rudder from propeller: Span, 45-55 $\frac{1}{2}$ ins.; dihedral, 1 $\frac{1}{2}$ ins.; stagger, 3 ins.; gap, 8 $\frac{1}{2}$ ins.

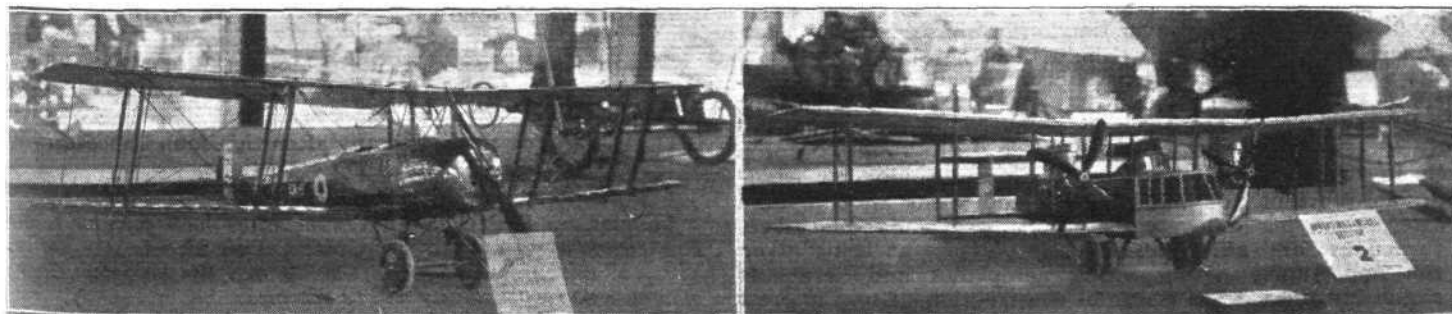
Messrs. H. A. Turner and G. A. Applebee's Model Hydroplane

THE above two members of the Handley-Page Club have forwarded particulars of the model racing hydroplane they had on exhibition and which I have embodied in the appended drawing. Although the results of the tests are not yet to hand, the machine has the appearance of being capable of a good speed and length of flight. I shall be interested to

"With regard to the K.M.A.A., I shall be glad to do anything I can towards a rejuvenation of same, and shall be pleased to offer the use of my commodious old premises here for any meeting of members you can arrange, if this is sufficiently central for the majority.

"I saw Mr. Stanger last night on the above matter, and he is only too pleased to meet competition in the way of power-driven models—several of which he has ready. Mr. Stanger did not know of any competition at the Aero show or he would have exhibited. Personally, the writer had not time to Show at Olympia, having a stand at the "Jamboree" following."

I should be glad to hear the views of others *re* the K.M.A.A., so that I may have a mass of representative opinion.



TWO MODELS AT OLYMPIA: On the left, the beautifully-made biplane model shown by Mr. George H. Robinson; and on the right, the model of a "family bus" shown by Mr. S. Henson

SIDEWINDS

HIS MAJESTY'S Consul at Riga (Mr. E. F. Cable) has reported to the Department of Overseas Trade that he intends establishing at the Consulate a collection of British catalogues and trade journals, for inspection by callers and distribution among local traders. United Kingdom firms who are interested in the matter are accordingly invited to forward a copy of any catalogues or other trade literature (in English or German) they have issued and, if desired, small samples of their products, direct to His Majesty's Consul, British Consulate, Riga, for inclusion in the collection.

WE hear that the demand for Cellon Dopes, etc., from abroad during the last few weeks has been most satisfactory. To start with, another order has been received from the Spanish Government for supplies pending the commencement of deliveries from the Spanish factory, and in addition to this large orders have been received from Greece and the Argentine—a very healthy indication of what may be expected in the near future. The display of rustless lacquers on the stand at the Show caused great interest, and as these can be made in all colours, also with opaque and transparent finishes, there should be a great demand for them. The "Cerric" solutions for wood to replace French polish were also a centre of interest, and a number of orders were booked for these.

THE American Simms Magneto Co., of East Orange, N.J., has nearly completed an addition to its present plant which will permit an increase of more than 100 per cent. in production. When the works are completed in August, a daily production of from 1,300 to 1,500 magnetos will be reached.

THE Martinsyde "Semi-Quaver" which won the Aerial Derby on Saturday, was doped with Cellon, and the fact reminds us that the winner of the first Aerial Derby in 1912, namely, Mr. T. O. M. Sopwith, likewise used Cellon on his Bleriot.

"A RECORD OF SUCCESS," the new Palmer booklet is both charming and beautiful, and it is not surprising to hear that the supply could not keep pace with the demand at the Show at Olympia. Apart from the practical information regarding Palmer aero wheels and tyres, the booklet contains reproductions in colour of eight fine water-colour paintings by Mr. Geoffrey Watson. All the prominent makes of machines are represented in flight, and from the point of view of colour and drawing the pictures leave nothing to be desired. The Palmer Tyre, Ltd., have now received a new supply and will be pleased to send a copy to anyone interested who will apply to them at 119 to 123, Shaftesbury Avenue, London, W.C. 2.

MR. F. T. COURTNEY, who won the aerial Derby at Hendon last Saturday on a Martinsyde "Semi-Quaver," used Wakefield's Castrol R. on the 300 h.p. Hispano-Suiza motor. He covered the course of 205 miles at an average speed of 153½ miles per hour, the fastest speed ever attained in this event.

As in last year's Aerial Derby so in the exciting contest of last Saturday—the first and second machines were equipped with B.T.H. magnetos. It is also interesting to note that B.T.H. magnetos are fitted on the "R.34," and have also been used on aeroplanes which have secured some 28 aerial records recently, all of which goes to support strongly the claim for reliability which is made on behalf of these magnetos.

THE Nawab Sala Jung made his first aeroplane flight on Wednesday week from the Central Aircraft Company's Aerodrome at Northolt. The Nawab, who was accompanied by his Staff, was flown over London in a 9-seater Limousine biplane, and expressed his delight at being able to see from the air. Lord St. Audries, the Hon. Maud Ackland Hood, Mr. S. De Moleyns and Mr. A. De Moleyns were among the many passengers who flew over London from the Northolt Aerodrome last week. The North London Motor Cycling Club visited the Central Aircraft Company's Aerodrome, Northolt, on Sunday last, and spent an enjoyable afternoon flying and watching others fly. Over 150 members turned up, and all expressed their pleasure at being given the opportunity of inspecting aeroplanes and aeroplane engines in the various stages of construction. Great interest was evinced in the big 9-seater twin-engined tractor biplane, which is now being tuned up at the aerodrome prior to its taking part in the Government Competition at Martlesham on August 3.

To Our Readers

As we continually receive complaints from readers that they experience difficulty in obtaining their copy of **FLIGHT** promptly each week, we draw their attention to the subscription form which is printed on page 6 of the current issue. If this is sent, accompanied by the appropriate remittance, to the publishing offices, 36, Great Queen Street, W.C., it will ensure **FLIGHT** being received regularly each week upon the day of publication.

NEW COMPANY REGISTERED

HARROGATE AERODROME AND LAND DEVELOPMENT CO., LTD., 6, Market Street, York.—Capital £26,000, in £1 shares. Objects, to acquire certain land and buildings at Harrogate, and to lay out the same for building purposes or for use as aerodromes, etc. First directors: A. E. Johnson, J. Butterworth, H. Wignall, G. W. Halliday, C. Grainger, A. Wiseman, and R. Holmes.

PUBLICATION RECEIVED

Fourth Annual Report of the National Advisory Committee for Aeronautics, 1918. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

AERONAUTICAL PATENTS PUBLISHED

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motors

APPLIED FOR IN 1917

Published July 29, 1920

12,918. R. GREGORY. Apparatus for determining and plotting the position of aircraft.

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 29, 1920.

14,269. W. J. MAY. Bomb-sighting and course-steering apparatus for aeroplanes. (145,810.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 29, 1920

7,714. SIR R. T. GLAZEBROOK, R. A. FRAZER and L. F. G. SIMMONS. Airship moorings. (145,834.)

8,347. H. SCOTT-PAINE and SUPERMARINE AVIATION WORKS, LTD. Mooring devices. (145,887.)

8,520. R. M. RUCK and W. C. GARDINER. Aircraft control devices. (145,890.)

8,523. G. C. ST. LOUIS and C. PEARSON. Aeroplanes. (145,891.)

8,810. C. J. STEWART. Oxygen apparatus for use on aircraft. (145,896.)

15,124. U.S. INDUSTRIAL ALCOHOL CO. Motor fuel for aeroplanes, etc. (128,915.)

APPLIED FOR IN 1920

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 29, 1920.

238. W. ZUROVEC. Captive helicopter flying-machines. (137,333.)

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